LOUDOUN COUNTY

DEPARTMENT OF FIRE AND RESCUE SERVICES

SERVICE PLAN

January 20, 2003

Prepared for the Loudoun County Board of Supervisors

By

TABLE OF CONTENTS

I. Executive Summary

The provision of fire and emergency services is a core element of any local government. Providing these services requires adequate physical and human resources, trained to high levels that can be rapidly deployed from strategic locations through the community. Accomplishing this goal requires personnel, vehicles, stations and a support system that provides recruitment, training, maintenance, and fire and injury prevention activities. In order for such a complex system to operate, it requires a well-planned and executed management infrastructure and process capable of meeting the many demands of providing emergency services. This service plan is designed to provide a road map for the County and the department to deliver the most effective and efficient service possible.

The Loudoun County Board of Supervisors adopted an organizational structure and plan on May 20, 2002 for the Loudoun County Department of Fire and Rescue Services (Department of Fire and Rescue Services). The Board established four primary goals for the department: Protection of life and property; volunteer participation; accountability; and operations and administration. The service plan as presented is designed to move the County toward meeting the goals as established by the Board of Supervisors.

Meeting these goals is the responsibility of a team effort by the Department of Fire and Rescue Services. The department is a complex system of volunteer and career personnel that meet the rigorous demands of providing fire and EMS services to Loudoun County's 214,726 citizens. This complex organization operates 24 hours per day, seven days per week, 365 days per year. Fire and rescue service is delivered from 19 separate station locations and a training and administration complex.

The Chief of the Department of Fire and Rescue Services is charged by the County with the overall management, supervision and leadership of 1,369 volunteers and 255 FTEs (full-time equivalent) career personnel. The Chief is a voting member of the Fire and Rescue Commission, which is further comprised of three volunteer fire members and three volunteer rescue members. A Board of Supervisors' member and the County's operational medical director serve as non-voting members of the Commission. The Commission serves as an advisory body and develops policies and procedures that assist in the management and governance of the Department of Fire and Rescue Services under the command of the Chief of the Department of Fire and Rescue Services, who is the system-wide Chief.

Providing these services requires goals and long-range plans that the Fire and Rescue Commission and the Chief develop collaboratively. Meeting the plans of the department requires that adequate financial and personnel resources be assigned to each plan. This plan addresses the long-term (five years) needs of the system. A long-term financial projection is completed in summary form for FY 2009-2023.

The current incident volume for emergency services in FY 02 was 18,397. This will increase to a projected call volume of 23,715 in FY 2008, an increase of almost 29

percent. By 2023, the population of the County is projected to be 410,615 and the Department of Fire and Rescue Services will respond to more than 35,500 calls per year.

This service plan addresses the resources that must be in place in order to meet the increasing demands on the fire and rescue services. The plan is put together under the six major divisions of the department: Volunteer Coordination and Support, Field Services, Fire Marshal's Office, Training, Communications, Planning and Administration. The plan outlines the resource needs in each section over the next five fiscal years. The detailed part of the plan lists by fiscal year the increases in resources that will be required.

Each of the programs in the service plan is dependent and inter-related to other programs. Each must be accomplished in order to deliver quality services to the citizens of Loudoun County. The driving forces in emergency services are rapid response times to emergency incidents, within prescribed time frames, with trained personnel equipped to intervene in the emergency situation, and then return the scene to a state of normalcy. The appropriate management and support structure must support this entire process.

The items below are the major points of the service plan. All recommendations are not included in this summary, but all programs that impact the direct delivery of service are covered. Cost estimates for each item can be found in the detailed sections of the service plan.

Response Times

Response times drive the entire planning process and service plans. New response time goals are recommended based on deploying emergency units on the scene within time frames as established by the National Fire Protection Association, the American Heart Association and the American Ambulance Association. The developed standards establishes goals that allows fire units to intervene prior to a fire event known as flashover from occurring, and for EMS units to intervene before irreversible brain damage occurs. The total response time—from call receipt in the 9-1-1 center until the arrival of a fire or EMS unit—is the recommended time measurement that should be used to measure system performance. A performance compliance level of 85 percent should be the measure that is used to measure system success. This means that 85 percent of the incidents in the county are receiving service within response goal time frames.

The plan requires an advanced life support unit to arrive on the scene of life threatening incident in less than nine (9) minutes and a basic life support unit to arrive at non-life threatening incident in less than fifteen (15) minutes. Fire unit response times are variable and are based on a suburban or rural classification. Fire incident response times are further broken down to the level of risk to the community should that property be involved in fires. Fire unit response goals vary from five minutes in suburban areas and to special-risk properties such as nursing homes, to 12 minutes in rural areas for low-risk properties such as sheds and barns. The established response goals can be found on page 44.

Fire and Rescue Station Construction and Renovations
Meeting response goals requires that stations be strategically located throughout the county. The existing 17 fire and rescue stations are no longer adequate to provide timely response to areas of the county that have experienced growth over the last 10 years. To this end, additional stations must be constructed in order to reduce existing response times and to meet the increased service demands as a result of population growth.

The service plan outlines the planned construction of six stations over the next five years, and the planning for station renovations. The 2003-2008 Capital Improvement Program (CIP) plan outlines a plan for construction. Based on community development and population growth, this plan recommends that the CIP time schedule be re-evaluated. The construction of stations in the Brambleton and Lansdowne areas should be accelerated in order to meet the needs of the growing communities where they are slated to be built. The Western Loudoun County Station could be delayed as the population and service demand growth is not as great as in the Brambleton and Lansdowne areas. Furthermore, the station renovation timeline should be accelerated to allow for stations to be renovated to increase the capabilities of stations to effectively house fire and EMS personnel who may be on stand-by 24 hours per day. Full information can be found on page 30.

The station funding construction plan recommendations are as follows:

Project	Current	Proposed
▪ South Riding Fire/Sheriff Station	---In Progress---	
▪ Broadlands Fire/Sheriff Station	---In Progress---	
▪ Dulles/Rt. 28 Fire/Sheriff Station	---In Progress---	
▪ Brambleton Fire/Sheriff Station	FY 2007	FY 2004
▪ Lansdowne Fire/Sheriff Station	FY 2008	FY 2005
▪ Western Loudoun Fire/Sheriff Station	FY 2006	FY 2009
▪ Fire Station Renovations	FY 2008	FY 05-12

Volunteer and Career Personnel
The construction of stations alone does not assure rapid response times. Trained personnel must be available 24 hours per day and be immediately deployed to calls for service. A combination of volunteer and career personnel accomplish this. Modern life has taken a toll on volunteerism, and volunteers often are not available during daytime hours, and in some cases, nighttime hours. To this end, a multi-faceted approach must be taken to assure consistent and reliable service delivery.

An aggressive volunteer recruitment program will continue to bring more volunteers into the system. A part-time volunteer recruitment program is planned for each volunteer station to enhance the existing recruitment and retention program. Increasing staffing to four-people on all units will require a five-year phase-in period recruiting an additional 63 volunteers each year. This will be beyond the current number of volunteers recruited. Volunteers will continue to work hand-in-hand with career personnel in existing stations. In new stations, a volunteer force of more than 100 people (based on 24-hour coverage,

seven days a week for one fire pumper and one ambulance) must be operational in order to provide service. In cases where volunteers cannot provide service in new stations, career personnel will be assigned.

Over the course of this service plan, career personnel are requested for the following deployments (FTE=full-time equivalent) Note: In Loudoun County, a FTE is an employee who works 37.5 per week. The FTE is adjusted based upon the total number of hours per week an employee works. Therefore, a firefighter/EMT who works 42 hours per week = 1.12 FTEs:

- Staff fire companies at Engine 2 (seven = 7.84 FTEs) and Engine 8 (seven = 7.84 FTEs), rescue companies at Rescue 4 (four = 4.48 FTEs) and 17 (four = 4.48 FTEs) during daytime hours.
- Staff three additional ladder trucks (14 = 15.68 total FTEs) with four-person each during daytime hours.
- Increase volunteer and career staffing to four-persons on all fire apparatus (22 = 24.64 FTEs). This will bring department in compliance with NFPA 1710 and assist in meeting the Virginia Department of Labor's two-in, two-out standard.
- Plan to staff all new stations with career personnel (72 = 80.64 FTEs).
- Plans for 16 = 17.92 FTEs in 2008 to supplement 24-hour staffing in stations.

Total cost and yearly plans can be found on pages 48-49.

Training

Personnel, vehicles and buildings will not assist the County in meeting its response goals unless the personnel, volunteer and career, are adequately trained. Additional positions would allow the department to provide training at multiple hours of the day to meet the scheduling needs of a large combination department. An increase in emergency medical services training will be required to continue to meet new national standards and educational requirements for basic and advanced life support. The service level for this program also can be enhanced through the implementation of an aggressive public education program. All of these increases in training will give department personnel the necessary skills to deliver the multitude of services that Loudoun County citizens expect and desire. The total program and plans can be found on pages 59-60.

The following service levels are recommended for this service plan:

- Enhancing an aggressive EMS training officer program (six = 6.72 FTEs)
- Increasing the fire training capabilities with additional fire training officers (three = 3.36 FTEs)
- Enhancing the public education effort to be proactive in preventing fires and accidents (six = 6.72 FTEs)

Fire and EMS Vehicles and Repairs
Trained personnel must have reliable equipment and vehicles in order to provide rapid response throughout the County. The service plan addresses the purchase and maintenance of fire and EMS vehicles. Loudoun County currently does not purchase fire or EMS vehicles, except for a training pumper and ambulance that are located at the academy. The cost of a pumper is currently $375,000 and an ambulance is $175,000. This service plan offers a program whereby the purchase of vehicles is a partnership between Loudoun County and the volunteer organizations. The addition of a fourth ladder truck should be implemented when the Broadlands Station opens. This will increase the ability to respond to large facilities with ladder trucks by more than 30 percent and reduce the wear and tear on the existing three ladder trucks.

Loudoun County will be responsible for purchasing one primary fire pumper and one primary ambulance for each station. In addition, the County will be responsible for the purchase of ladder trucks and heavy rescue squads where volunteer companies are unable to bear associated costs. The service plan outlines the philosophy of vehicle replacement on pages 30-33.

The apparatus replacement plan is projected to begin in FY 04. An average annual cost of $925,000 will be required to implement this plan. The volunteer organizations will then be responsible for all other vehicle purchases for their station. In some cases, volunteer organizations may elect to continue to buy all of their vehicles, and thus reduce the budget demands on Loudoun County.

A reserve fleet will be implemented as the apparatus plan is implemented. The American Public Works Association utilizes 10 percent as the percentage of a fleet that should be in reserve. Ten percent of the mission critical vehicles will result in three reserve pumpers, three reserve ambulances and one reserve ladder truck.

The second part of the vehicle plan is the yearly maintenance cost for vehicles. All volunteer organizations currently maintain their own vehicles. The cost to do so continues to place a strain on some volunteer companies and can result in inconsistent levels of maintenance on emergency vehicles. This plan is recommended to begin in FY 05. The annual cost for vehicle maintenance is estimated at $1,315,000. The full vehicle plan can be found on pages 32-35.

The following are highlights of the programs proposed for vehicles and equipment:

- Implement an apparatus replacement plan for pumpers, ladder trucks and ambulances.
- Implement a reserve fleet program to have 10 percent of engines, ladders and ambulances in a reserve fleet.
- Implement a vehicle repair program for all fire and rescue equipment and apparatus in the County.
- Institute a personal protective equipment replacement program for all personnel.

Management and Support Programs

Maintaining the support services for emergency responses requires that data be collected, managed and utilized for decisions. It also requires the necessary personnel to be assigned to functions such as fire prevention, communications and administration.

One of the major components of the service plan is the development of an appropriate data information system. This will include the purchase and implementation of a new Computer Aided Dispatch (CAD) system and a records management system (RMS). The current CAD system provides basic dispatch functions; however, it does not meet the needs of the Department of Fire and Rescue Services. Implementing an integrated CAD and RMS system will assist the department in the efficient deployment of resources, enhanced dispatching services, and a means to analyze and evaluate data.

The highlights of the department's support services include:

- Replace current Computer Aided Dispatch system.
- Implement a comprehensive records management system.
- Continuing the wide area computer network between all fire and rescue stations.
- Increasing the Fire Marshal's Office staff by six = 6.72 FTEs to meet increased demands.
- Implementing a fire prevention/inspection tracking software program and handheld computers.

The current budget for FY 03 is $24,207,033. The implementation of this service plan will increase the budget over a five-year period to $41,168,730 (including personnel for new stations). On the surface, the increases are significant; however, the desired service levels cannot be maintained or increased without a full commitment to a plan and financial support to meet the needed service in the future.

The service plan, as outlined, gives the Loudoun County Department of Fire and Rescue Services the resources, staffing and strategically located facilities that will meet the increased demands for fire and rescue services in the County. To that end, the goals of the Board of Supervisors and the Department of Fire and Rescue Services can be met and prepare the department for the increased service demands of the future.

II. Service Plan Development

a. Narrative Summary

The EMSSTAR Group (EMSSTAR) used the expert panel approach to problem solving, and in doing so formulated a team of national experts in the field of fire/EMS and emergency management. Team members had experience in various delivery types and are active practitioners in their home systems. The team members have experience in paid, volunteer, combination volunteer/paid, private, third service, public utility, government, rural, urban and high performance systems in various parts of the United States. Team members with emergency medical and fire science undergraduate and post-graduate (or related) degrees complement this experience.

b. Public Outreach Activities

EMSSTAR, in coordination with Loudoun County, conducted on-site interviews with more than 200 stakeholders of the County system. Interviews were held with numerous Department of Fire and Rescue Services staff, County government staff, volunteers, town mayors, homeowners associations, Board of Supervisors members, Fire and Rescue Commission members, neighboring service providers, business and industry representatives (including the Loudoun County Chamber of Commerce) and County Administrator's Office staff. In addition, EMSSTAR staff has conducted several open public meetings with volunteer EMS and fire service providers and has conducted many one-on-one interviews at field stations. Public and system stakeholder input also was solicited via a project Web site established for that purpose.

c. Standards Development

The Loudoun County Board of Supervisors, recognizing the rapidly changing environment, issued a request for services to hire a consultant to develop a model fire/EMS and emergency management plan for Loudoun County. The EMSSTAR Group, LLC (EMSSTAR) was awarded this contract on October 27, 2000. EMSSTAR completed an extensive review process that involved focus groups, one-on-one meetings, group meetings, site visits and meetings at fire and rescue stations throughout the County. The EMSSTAR report included four tasks that were completed: development of a model fire and rescue program, development of service levels, benchmarking the County system and development of an implementation plan.

After extensive review and study of the EMSSTAR plan, the Board of Supervisors approved a new organizational structure and management process for fire and rescue services in May 2002.

In developing the model, EMSSTAR utilized more than 20 assumptions based on data, interviews, history and tradition, system demands, growth predictions and various other

indicators. Once the model had been developed, the EMSSTAR Group developed three service levels—high, average and minimum as specified in the contract from the County—for consideration for each of the 17 attributes of the model. In addition, EMSSTAR recommended a service level that it believes to be appropriate for the County for each of the 17 attributes. This implementation document is used as a base for the development of the service plan. However, details of program implementation can be obtained from task two and task four of the EMSSTAR report.

d. Comparative Analysis

The benchmarking process was completed by the EMSSTAR Group as a part of the system study. In completing the benchmarking process (task three), comparison was made against the model developed for the County. In developing this model, comparisons were made between the Loudoun County system and other systems that provide similar services. The comparative analysis reviewed Loudoun County in conjunction with career/volunteer, fire-based, public utility, third service, hospital-based, private, primary service area, tiered response, open competition, subscription and mixed/combination systems. The service plan is predicated on a system that works best in Loudoun County. That system utilizes a combination of volunteers and career personnel to meet the service demands of the County.

III. Department Background

a. Mission Statement

The Loudoun County Department of Fire and Rescue Services provides residents and visitors with efficient and cost-effective fire protection, rescue and emergency medical services, responds to hazardous materials incidents and related life-safety functions. The department maintains a staff of well-trained volunteer and career personnel located in strategically placed facilities 24 hours per day, seven days per week.

Goals as established by the Board of Supervisors:

Protection of Life and Property—Provide cost-effective, equitable and responsive services to all citizens of Loudoun County, including adequate response times, effective fire and rescue incident supervision, adequate staffing, effective distribution of personnel and apparatus and timely adaptation to changing service needs. All organizations and participants comprising the fire, rescue and emergency medical system shall share responsibility for continuously improving their effectiveness and efficiency.

Volunteer Participation—Involve volunteers in decisions related to operations, procedures and guidelines through representation on the Fire and Emergency Medical Services Councils and the Fire and Rescue Commission. Promote continual improvement in the capabilities and job performance of volunteer members. Promote the highest caliber conduct of volunteer members.

Accountability—Maintain accountability to the Board and Loudoun County citizens for effective service delivery, sound management practices and the responsible use of public funds.

Operations and Administration—Maintain effective service delivery levels while minimizing associated costs of administrative overhead and operational expenses, including apparatus, facilities and equipment. Effectively manage volunteer resources, purchasing, maintenance, training and other programs.

b. Department Description

The Department of Fire and Rescue Services is organized into six divisions: EMS/Volunteer Coordination and Support, Field Services, Fire Marshal's Office, Training, Communications and Planning and Administration. The department provides administrative support to the County's volunteer fire and rescue companies and the Fire and Rescue Commission and supports volunteer personnel with career staff where needed. In addition, the Department of Fire and Rescue Services maintains the County's Emergency Communications Center, conducts all code-related fire inspections and

investigates the causes and origins for fires, explosions and hazardous materials incidents.

c. Department Structure

The Board of Supervisors is committed to providing Loudoun County citizens with competent, effective and efficient fire, rescue and emergency medical services. Responsibility for the provision of these public safety services in Loudoun County rests with the Department of Fire and Rescue Services.

The Board believes that fire, rescue and emergency services should reflect cost-effective service provision, recognition and promotion of general public welfare, accountability for service levels and resource use in a manner required of all public programs, fair representation and communication of all views regarding these services, and adequate response to projected growth within the County. These objectives will be achieved through a combined volunteer and career system, as endorsed and supported by the Board of Supervisors, defined by these essential characteristics:

Mutual and cooperative delivery of fire, rescue and emergency medical services through a combined system of volunteer corporations and career staff employed by the County.

Recommendations to the Board from the Fire and Rescue Commission and the Chief of Fire and Rescue Services regarding fire, rescue and emergency medical service levels, system policy, standards and agreements.

Development and revision of fire, rescue and emergency medical operational procedures. The Chief of Fire and Rescue Services is responsible for all system-wide operations and, with the Commission, shall establish procedures and guidelines to implement Board policies.

The Board of Supervisors maintains ultimate approval authority over all policies and procedures. In the event of an impasse between the Chief and the Commission, the Board will have final authority to establish policy and procedural direction of the system.

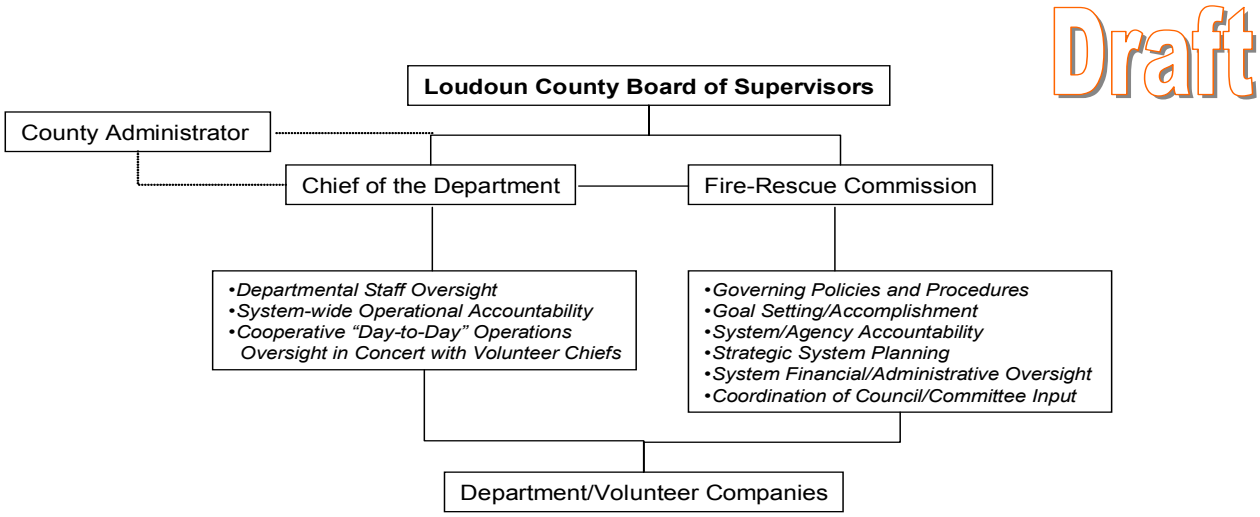
Service delivery must be provided on a countywide basis and must be characterized by uniformity in emergency response performance and in the application of operational regulations and procedures. The Board recognizes and respects the contributions of volunteers, which have resulted in the protection of life and property in Loudoun County, and vital and generous private support for essential public services.

The County will vigorously support the continuation and expansion of volunteer participation as a means of providing fire, rescue and emergency medical services in a cost-effective manner while encouraging qualified volunteer participation.

Composition of the Fire and Rescue Commission

Members of the Fire and Rescue Commission are appointed by the Board of Supervisors and serve staggered two-year terms. The Commission has seven voting members who are the Chief of the Department of Fire and Rescue Services, three volunteer fire members and three volunteer emergency medical services members. The County's operational medical director and a member of the Board of Supervisors serve as non-voting members of the Commission.

Organizational Structure - Fire-Rescue System



d. Organizational History

Loudoun County has a history of strong volunteer fire and rescue companies. Seventeen independent companies provide operational fire and rescue services. The volunteer companies own all of the operational fire and rescue stations and most of the rolling stock, which includes 31 fire engines, 29 transport ambulances, three ladder trucks and other specialized apparatus.

Volunteer Demographics

The volunteer fire and rescue system includes approximately 1,369 volunteers, of whom 58 percent are considered operationally active. The number of active volunteers has remained relatively constant over the past five years. Retention is a major issue. During FY 02, 100 volunteers left the system while 200 new members joined volunteer agencies in the County. Time pressures including jobs, family, substantially increased training requirements, fund-raising demands and increased call volume have had a measurable impact on retention.

While the County's daytime work population has continued to grow, changing demographics have greatly reduced the number of volunteers available during this time period. In FY 03, the County provides daytime career support in 13 of the 19 fire and rescue stations. The FY 02 budget provided additional career staff for Arcola, South Riding, Loudoun Rescue (Leesburg), Sterling Fire, Aldie, Lucketts, Round Hill and Broadlands. A temporary facility that was opened in South Riding in December 2001 requires career staff coverage around the clock to augment volunteer resources. In addition, a full-time career advanced life support unit was put into service in May 2001.

New Service Demands

From FY 99 to FY 02, emergency call volume increased from 15,874 to 18,397 incidents. The construction of huge campus-like facilities and other large buildings has created different types of potential hazards and new demands for proactive inspections. In 2002, the fire and rescue system must be able to handle urban as well as rural hazards. In the eastern end of the County, several new stations are required to address the needs of the working population centers and the new residential centers. The western end of the County also has been experiencing increased residential construction, which has generated higher call volumes and rural water supply issues. In addition to emergency services, the Department of Fire and Rescue Services provide a multitude of community services such as car seat safety inspections and public fire and life safety education.

Funding Volunteer Companies

Historically, several volunteer companies have obtained an annual stream of revenue through the proffer process. Concerns raised at the state level regarding the proffer process prompted the Board of Supervisors in FY 02 to substitute local tax funding in anticipation of the elimination of operating proffers for these stations. The FY 03 budget continues this practice. Several companies also are experiencing capital construction and equipment acquisition issues.

Growth of the Department

The Department of Fire and Rescue Services has grown considerably in recent years to address these issues, from 56.5 FTEs in FY 93 to 254.83 FTEs in FY 03. In the future, additional career personnel will be needed to provide weekend and holiday coverage, and in some cases, to provide 24-hour coverage. Although positive steps are being taken to meet these new challenges, the Department of Fire and Rescue Services is strained to meet the challenge of this growth. In order to progress from the current status, the system must focus on the development and implementation of a strategic plan so that growth can be managed in a more proactive manner. Recruitment, training and retention of career firefighters and EMTs also will continue to be a challenge in the competitive employment market.

IV. Program Background

1. EMS/Volunteer Coordination and Support

a. Program Description

This program provides oversight and support for emergency medical services and the volunteer recruitment and retention through the following program components: recruitment advertising, referrals, retirement points, personal property tax reduction, County vehicle decals, awards, physicals, system-wide newsletters, leadership seminars, business discounts and other special projects. The program also provides staff support to the Fire and Rescue Commission's Benefits Committee and the Volunteer Retention and Recruitment Committee, which develop new programs to enhance the combination (volunteer and career) system.

b. Service Provision

This component of the fire and rescue system is comprised of 17 volunteer agencies strategically located throughout the County. All volunteer fire and rescue stations, equipment, fire trucks and ambulances are owned and maintained by the volunteers. Some of the companies are organized primarily to provide fire suppression services, some provide emergency medical and rescue services and some are structured to provide both. Each company operates as a chartered independent agency responsible for developing its own operational and administrative polices and managing its own budget.

Public Education

The public education program emphasizes community outreach and delivery of public education programs targeting County residents. Ongoing coordination of the department's child safety seat program, community outreach and creating effective partnerships with the school system, public safety agencies and other civic organizations are among the program's priorities. A balanced approach to program delivery integrates direct citizen contact, media releases and the development of a team of allied fire and life safety educators. The File-of-Life program, funded through a private-sector grant, assists the emergency management program in developing the A.F.T.E.R. team, which will aid organizations such as the American Red Cross in providing assistance to residents suffering fire loss. The department's role in facilitating community defibrillation programs and ensuring their seamless integration with community EMS resources will also continue to play an important role in this section's work program.

c. Demographics of Client Base

This program is directly impacted by any and all population changes in the County. Emergency services are delivered to all citizens, businesses and visitors, so the growth of the County will result in a direct impact on the number of incidents that must be handled by this program. The growth of businesses in the County has an even greater impact on this program, given the increasing number of incidents that typically occur during normal business hours. Volunteers are less likely to be available during daytime hours. As such, increase in commercial growth will have an adverse impact on the ability of this program to adequately provide services.

The public education portion of this program is directly impacted by the increase in the population in the County. Programs are directed at specific audiences such as children, senior citizens and community groups. Each group has special needs and thus must be evaluated appropriately in future plans for public education programs.

d. Service Delivery Issues

Financial Performance

Financially, each company secures funding for facilities, equipment and apparatus. In recent years, volunteer income has fallen short of actual expenditures, due largely to the elimination of annual proffer payments and the impact of inflationary increases. In FY 02, County subsidies will account for approximately 77 percent of the volunteer companies' annual operating expenses.

Recruitment

During the late '80s and early '90s, efforts were made to assist with volunteer recruitment and retention. As a result, volunteer enrollment has grown substantially, although these increases have not kept pace with the rate of population growth in Loudoun County. Research indicates that on average, only 60 percent of the active volunteers meet the eligibility criteria for retirement benefits and personal property tax reduction. Juggling the multiple demands of modern life places a significant strain on many volunteers; many leave within the first few years of service. In addition, it is desired to increase all fire units to four-person staffing. This will require additional personnel to be recruited for each company in order to meet this service plan requirement.

Public Education

The delivery of public education must remain a priority for the department. As the population of the County increases, the demand for public education also will increase. It will be imperative for the department to continue to deliver this proactive means of fire and accident prevention. This function will become more critical as residents will demand to know more about safety and emergency procedures for all types of threats, including terrorism.

e. Policies and Mandates

The Fire and Rescue Commission and the Chief set policies that impact this program. The Commonwealth of Virginia has few mandates for firefighters but does have minimum requirements for personnel that provide emergency medical care. In order to provide emergency medical services, personnel must meet minimum standards and complete continuing education in order to continue as an EMS provider.

There are a number of national consensus standards that are not mandates but are generally accepted practices for the provision of emergency services. All personnel should meet minimum training and continuing education requirements in accordance with generally accepted practices.

2. Field Services

a. Program Description

This program provides weekday 12-hour (6:00 a.m. to 6:00 p.m.) staffing and response in fire and rescue stations and maintains operational readiness for fire and medical emergencies. Field services also provide 24-hour coverage at the South Riding Station and to advanced life support (ALS) units in the Leesburg and Ashburn areas. Other activities that support the readiness and effectiveness of response (i.e. training, public education, car seat safety inspections, building surveys and street mapping) are included in field services' scope of work.

b. Service Provision

Field Operations

Currently the County provides daytime coverage (6:00 a.m. to 6:00 p.m.) to 13 of the 19 volunteer stations. In addition, the County provides 24-hour/seven-day coverage for two stations, namely the new South Riding Station and advanced life support units in the Leesburg and Ashburn areas. The number of authorized field staff has increased from 13 in FY 96 to 139 currently. Career staff has been assigned to volunteer stations at the request of the volunteer companies, usually in response to daytime coverage problems or increases in call volume. Career staff involvement in emergency calls rose from 6,016 in 2000 to an estimated 7,200 in FY 03. In FY 02, 29 additional firefighter/EMT positions were approved for staffing in the Sterling, Aldie, Round Hill and Lucketts Stations, as well as the future Broadlands Station. The FY 02 budget also included funding for two battalion chiefs to begin implementation of intermediate management for the career staff.

EMS Services

All career field staff are cross-trained to provide fire fighting and emergency medical services. Cardiac technicians and paramedics are trained to a higher standard and are allowed to practice advanced life support procedures, including the use of medications and advanced cardiovascular procedures. Recruitment of firefighters and paramedics continues to pose a challenge for the department. Surrounding jurisdictions, faced with a high volume of retirements, have been recruiting in earnest. In the past, fully trained personnel were hired, given an orientation to the department and assigned to a station. Beginning in 1999, the department began a recruit academy program as an attempt to deal with the changing job market. The school, which lasts 22 weeks, is designed to teach all the requisite skills for beginning firefighters and EMTs. Attracting and retaining qualified personnel will continue to be a priority for this program.

Public Education

Population growth increased the demand for public education provided by the field staff. During FY 01, field staff conducted more than 2,100 child safety seat inspections and held about 400 fire safety talks with approximately 10,000 attendees. It is anticipated that this number will increase slightly in FY 02 as services are expanded into the South Riding community.

Special Operations

Coordination of the department's hazardous materials response team and program management is included in this section. Increased frequency of special events requiring EMS bike team support and an expanded team roster will see an increase of assets necessary to meet demand for this specialty unit throughout FY 03 and into FY 04.

Personnel safety is a paramount concern as the department rapidly grows in response to service demands. The mission of the department is an inherently dangerous one that leaves zero tolerance for gaps in safety.

c. Demographics of Client Base

This program is directly impacted by any and all population changes in the County. Emergency services are delivered to all citizens, businesses and visitors, so the growth of the County will result in a direct impact on the number of incidents that must be handled by this program. The growth of businesses in the County has an even greater impact on this program, given the increasing number of incidents that typically occur during normal business hours. Field services will continue to increase the percentage of incidents that are handled by career personnel.

d. Service Delivery Issues

The delivery of field services continues to be a challenge as the demand for fire and EMS services increases. Likewise, the available time for volunteers to respond to incidents continues to decline. This creates a critical need for additional career personnel in order to meet the demand for services.

The decision to place career personnel in a station is often complicated by the many factors that must be considered prior to assigning career personnel to a station. Another challenge is the inability to project with certainty when career personnel may be requested or required to staff a station. This creates a budgetary challenge, as the needs may not coincide with the normal County budget cycle.

The biggest issue in this area will be the continuity of quality, reliable and consistent emergency response capabilities throughout the County 24 hours a day, seven days a week. Companies that currently have no physical stand-by staffing must be staffed if minimum response standards are not being met. Staffing must be increased on all engines and trucks to a minimum of four people, effectively doubling the capacity on emergency scenes. The staffing of ladder trucks will require additional resources during daytime hours in order to assure that all functions are readily available on emergency incident scenes.

The provision of emergency medical services also creates ongoing issues. EMS is typically considered a part of the health care system. As such, there are minimum training requirements, accepted standards of care, medical oversight and review and continuing education issues that are required for all pre-hospital care providers.

There will be additional challenges in the future as the training curriculum adopted by the Virginia Department of Health, Office of Emergency Medical Services will require a greatly increased number of hours in order to operate at the level of a paramedic—the current highest level of pre-hospital provider certification.

e. Policies and Mandates

Policies for field services come from multiple entities. General departmental policies are set within the department itself. The Loudoun County Department of Human Resources has policies that must be adhered to by employees and supervisors.

The Virginia Department of Labor, which administers the Occupational Safety and Health Administration (OSHA), has a litany of mandates and policies that all employers and employees must adhere to. The Virginia Department of Health, Office of Emergency Medical Services has minimum training certifications that must be obtained and maintained in order to provide EMS.

Finally, there are a number of national consensus standards that are primarily developed by the National Fire Protection Association (NFPA). These standards cover a myriad of fire and EMS issues, such as protective clothing, apparatus, safety and health, deployment, etc. Even

though these standards may not be binding on the County, the Virginia Department of Labor has indicated that in the absence of a specific OSHA policy, it will typically look to a national consensus standard as the industry standard. This approach requires that the administration routinely monitor all industry standards and develop a plan for compliance as appropriate.

3. Fire Marshal's Office

a. Program Description

The Loudoun County Fire Marshal's Office is responsible for investigation of all fires, explosive ordinance disposal and explosions, hazardous materials incidents and related environmental crimes as mandated by local, state and federal law. In addition to investigations, the Fire Marshal's Office performs fire and life safety inspections for all Loudoun County businesses. This program is organized into two sections: Inspections and explosive ordnance disposal (EOD), which is primarily responsible for routine code enforcement activity and houses the department's Bomb Squad and Special Operations, which has primary investigation responsibility. The division operates three specialized canine units, one for arson detection work and two for explosive detection.

b. Service Provision

Investigations

Between FY 01 and FY 02, the total number of fire investigations increased by 80. With 3,049 investigations conducted during FY 02, the division has a criminal conviction rate of 82 percent, which exceeds the national average of 43 percent. Fire loss for the same period was $5,720,000, a decrease of $1,850,670 from the previous fiscal year. Current trends indicate a continued yearly increase in investigations of eight to ten percent.

Inspections

In FY 01, the Fire Marshal's division completed 6,779 fire and life safety inspections and in FY 02 they completed 8,716 inspections, an increase of 1,937 inspections. The increase was a direct result of the hiring of an additional part time fire inspector whose only responsibilities are to conduct fire and life safety inspections and evening shift investigators doing spot check inspections of assembly occupancies. Inspectable properties will continue to increase over the next three to five year period at a projected rate of 6% annually.

Juveniles

The Juvenile Fire Intervention program continues to grow dramatically. Upon determination that a juvenile started a fire, the child is brought in for counseling and education. During this process, determination is made as to whether the child continues in the program or is referred to the County mental health authorities for further counseling. The number of children participating in the program grew by 22 percent, from 110 in FY 01 to 197 in FY 02, with zero percent recidivism to date. Even with public education available, the national trend of the juvenile fire setter problem will continue to increase at a projected annual rate of 18 to 20 percent.

Bomb Disposal

In FY 02, the Bomb Squad handled 78 incidents. The FBI-accredited Bomb Squad has five certified bomb technicians and includes an ATF-certified canine unit.

c. Demographics of Client Base

The primary client base for this program is the citizens of the county, with special emphasis on the business community. The Fire Marshal's Office is charged with inspecting businesses throughout the County to assure that applicable fire codes are being followed. The number of juvenile fire setters continues to increase. Based on historical data, the increase in the youth population of the County will have a direct impact on this program over the next 20 years.

d. Service Delivery Issues

The continued growth of the County will impact the Fire Marshal's Office in numerous ways. Increased businesses in the County create a service demand for additional inspection services. This requires the Fire Marshal's Office to have adequately trained staff to meet the requirements of the County fire prevention code and to complete proactive inspections for all County businesses. Additionally, the increase in population and resulting increase in emergency responses by volunteers and field services creates additional service demands for fire investigations. The Fire Marshal's Office must continually monitor the workload and fire cause determination clearance rate to assure that the needs of the County are met.

Likewise, as the school population of the County increases, the incidence of juvenile fire setters is anticipated to increase, based on national trends and historical data. It is critical that adequate resources be directed to this program.

An issue in the future will be the continued training and recertification requirements set forth for fire marshal personnel.

e. Policies and Mandates

Policies for field services come from multiple entities. General departmental policies are set within the department itself. As employees, the Loudoun County Department of Human Resources has policies that must be adhered to by employees and supervisors.

The Virginia Department of Labor, which administers the Occupational Safety and Health Administration (OSHA), has a litany of mandates and policies that all employers and employees must adhere to.

The Virginia Department of Fire Programs, the Virginia Department of Housing and Community Development and the Office of Justice Programs further cover fire inspectors and investigators under rules and regulations as established. Each of these entities has minimum requirements that fire marshals, fire inspectors and fire investigators must meet in order to operate in the commonwealth of Virginia. In addition, fire investigators must conform to the normally accepted standards for police officers in Loudoun County.

4. Training

a. Program Description

Training responsibilities include the coordination and delivery of EMS, fire, technical rescue, hazardous materials and safety related training to all system personnel. Training responsibilities also include professional development educational programs in areas such as leadership and instructional theory, and practices and facilitation of departmental quality assurance and quality improvement. Public education activities include coordination of all fire and life safety public education initiatives, coordination of community-based training delivery, collaboration with other public and private sector partners in community safety education and support of activities such as station tours, citizen CPR classes and child safety seat inspections. This program provides liaisons to various local, regional, state and national work groups and committees and coordinates special service-related programs.

b. Service Provision

Training

The training section supports a career and volunteer staff of more than 700 qualified firefighters and EMTs, as well as more than 130 certified paramedics. The daily increase of large-scale corporate developments continues to present new fire fighting challenges requiring specialty training. Recurrent delivery of basic certification courses of three to six months duration each and enrollment levels totaling 150-200 new students per year are required to ensure maintenance of adequate system staffing levels, as the average two year "service life" of a volunteer responder produces continuous turnover. Recruitment of qualified applicants to fill Board-authorized training positions has been difficult given the competitive regional labor market.

c. Demographics of Client Base

The primary client base for training is internal members of the fire and rescue services. The population at large is the primary client base for public education efforts. The increase in the number of new career personnel and the recruitment of additional volunteers directly impacts the program. Once personnel are initially trained, the programs must then change to provide continuing education for all active members.

In addition, the changing demographics of the County have a direct impact on the training program. Changes in demographics will impact the department by requiring additional training programs and skills to meet the changes in buildings and in residents. This will require the department to implement new programs such as geriatric care, multi-lingual classes, high-rise fire fighting, etc.

d. Service Delivery Issues

Delivering training will continue to be a challenge for the department. The combination system requires that training be available during weekdays, weeknights and weekends. In order to have an effective volunteer system, all members must have training opportunities readily available. This requires that the same level of instruction be assigned to all members of the department. This places a tremendous demand on the training staff and will require staffing almost 16 hours per day, seven days per week in order to provide necessary training. The delivery of leadership and management training will continue to be a delivery challenge, as well as motivating personnel to attend this type of training.

The delivery of new and updated EMS training programs will place a new demand on the training division, and new and innovative methods must be explored to meet state standards. New EMS training standards place a tremendous responsibility on this division in order to meet minimum training hours.

e. Policies and Mandates

Training policies and mandates come from the department, human resources and the commonwealth of Virginia. The Virginia Department of Fire Programs develops training programs that must be adhered to in order to award state certification. The Virginia Department of Health establishes EMS training programs, and the Virginia Department of Labor mandates specific training programs in areas such as hazardous materials, confined space rescue, trench rescue, self contained breathing apparatus, etc.
Even though volunteers do not fit the definition of an employee and thus are not directly covered by OSHA standards, the volunteer retirement system can be considered compensation and thus subjects all volunteers to all OSHA rules and regulations.

Regardless of this determination, all fire and rescue personnel should be awarded the same level of protection and training in areas that impact safety of other firefighters and EMS personnel.

Finally, the National Fire Protection Association standards place specific requirements on items such as burning structures for fire training, safety, etc.

5. Communications

a. Program Description

This program serves the Public Service Answering Point for fire, rescue and police incidents using the County's enhanced 9-1-1 (E-9-1-1) system. Emergency and non-emergency fire and rescue calls are processed and the appropriate fire and/or rescue apparatus dispatched to respond to the situation. Police related calls are received and transferred to the appropriate law enforcement agency. This program also provides a means of handling man-made and/or natural disaster situations with regards to preparedness, mitigation, response and recovery.

b. Service Provision

The Department of Fire and Rescue Services is responsible for the operations of the Public Service Answering Point (PSAP), the primary 9-1-1 answering point for the County. Fire and rescue dispatchers answer all calls made through the 9-1-1 system in Loudoun County. Calls requiring law enforcement are forwarded to dispatch centers for the County sheriff, Leesburg Police or state police.

Emergency Communications Center

The Emergency Communications Center operates 24 hours per day. Each shift includes dispatchers who are trained in emergency medical dispatch procedures. It is not unusual for dispatchers to be called upon to provide medical instructions prior to emergency personnel arriving at the scene.

With the proliferation of cellular phones there has been a marked increase in the number of calls made to the Emergency Communications Center. It is not unusual for a single incident to generate as many as 30 calls. Cellular calls account for 39 percent of the emergency phone calls handled by the center. Dispatch operations are assisted by the County's Computer Aided Dispatch system (CAD). The CAD system provides dispatchers with location information on landline calls and provides constant updates on the status of units sent to the scene. Maintaining an accurate database is essential to the proper operation of the CAD system. The FY 02 adopted fiscal plan included a systems analyst to manage this process.

Emergency Management

The Communications Division is also responsible for the County's emergency management program, which includes pre-planning for emergencies, response, remediation and repair. Given the location of the County, advance planning and training are needed for a variety of potential crises. Pre-planning is an essential component of a County's ability to handle threats to public health and safety. Emergency management will play a key role in the newly formed Special Events Planning Committee assisting event organizers to plan for a safe and successful event while minimizing the impact the event will have on the surrounding communities. The FY 03 budget includes an enhancement to provide dedicated resources for this function. This section is directly responsible and accountable to the Chief of the Department of Fire and Rescue Services, but the budget responsibility remains in this division.

c. Demographics of Client Base

The demographics for this service are the general population of the County, visitors, businesses and travelers through the County. Any person that accesses 9-1-1 in the County does so through this center. As the County grows and as cellular service continues to increase, the client base of this program will grow tremendously.

Likewise, the delivery of emergency management services is aimed at the entire population of the County. The threat of terrorism and for similar acts has highlighted the need for emergency management. The client base has increased dramatically over the last year, as more citizens look toward County government for information and direction in the event of a terrorist threat or attack, even in Washington D.C.

d. Service Delivery Issues

Continuing service will require constant monitoring of the number of calls that come into the communications center. As cellular phone technology changes, additional demands will be placed on 9-1-1 centers to deal with the myriad of location determination technologies.

To keep up with technology it will be imperative to have a state-of-the-art Computer Aided Dispatch system that can integrate with fire, EMS and police services both in the County and in the northern Virginia region. Additionally, as emergency communications systems become more complex, the job requirements for employees also will increase.

The department currently does not have a standard records management system. Obtaining data and information from all aspects of the department is not possible at this time. The need for accurate and complete data to make good decisions will be critical to the future management and integration of the department.

Emergency management must plan for man-made and natural disasters, with more emphasis placed on man-made and terrorism-related issues. It will be imperative that the County maintain current emergency plans and be able to fully implement those plans at a moment's

notice. Likewise, the emergency management system must be able to provide services at mass gathering events, and be able to provide services during peek demand periods of the event.

e. Policies and Mandates

Policies for communications and emergency management come from multiple entities. General departmental policies are set within the department itself. As employees, the Loudoun County Department of Human Resources has policies that must be adhered to by employees and supervisors.

Minimum dispatcher qualifications are dictated by the Virginia State Police. Further, there are minimum standards for dispatchers that provide emergency directions via the telephone prior to the arrival of emergency personnel. Certification programs are available that will standardize the communications officer training. The Association of Public Communications Officers has standards that should be evaluated and implemented.

Emergency management personnel must meet minimum requirements as set forth by the Virginia Department of Emergency Management. Many of those requirements are only required in order to meet minimum requirements to receive federal or state funds. However, it is critical that all of the emergency management staff and key officials understand the interaction of Loudoun County, the commonwealth of Virginia and the Federal Emergency Management Agency (FEMA).

6. Planning and Administration

a. Program Description

This section is managed by a deputy chief and is responsible for all of the planning, Capital Improvement Program (CIP) project/procurement management, human resources, organizational development, purchasing, GIS, inventory management, Fire and Rescue Commission support and logistics for the department. While the section does have a dedicated budget, many of the procurements managed by this program are currently distributed across all program lines in accordance with the amount of support that each program receives from the planning and administration function.

b. Service Provision

The role of this program is to support the operation of the department through the use of solid planning principles and management processes. The program works with all parts of the department and system-at-large to assure that County and department standards are being met, and that logistics “supply lines” are intact. The provision of GIS serves to give the administration necessary information and data that can be used to make decisions regarding all aspects of fire and rescue service in Loudoun County.

c. Demographics of Client Base

The primary client base for this program is internal members of Loudoun County. A secondary base involves vendors for all of the services and equipment that are purchased by Loudoun County. The internal clients include employees, the Chief, County administration, County purchasing, volunteers, the Fire and Rescue Commission and career applicants. The client base is fairly static, and program managers can predict the demographics of the personnel that require interaction.

d. Service Delivery Issues

Service delivery issues revolve around the ability to meet all of the demands from the numerous components of the department and the County. As the reporting system becomes more advanced and sophisticated, additional data will be requested by the administration. The program manager will need to prioritize the numerous requests and assure that time is not wasted on small or insignificant programs.

With real estate development increasing, particularly in the form of large campus complexes, high-rises, residential communities and commercial properties, this division's ancillary duties have increased dramatically, and the need exists for precise address mapping and tactical pre-planning.

e. Policies and Mandates

This program will fall under all of the policies and mandates of Loudoun County and the Fire and Rescue Department. In addition, the program must adhere to federal and state laws as it relates to employment practices. Further, all state purchasing laws must be followed when procuring items and services through the department buyer.

The program must be aware of all National Fire Protection Association (NFPA) standards as it relates to managing the planning, project management and logistics functions of the department.

V. Service Plan Standards

1. Capital Facilities

The capital facilities for the department will be focused on facilities and fire and EMS apparatus. The full narrative for each section can be found in the Loudoun County FY 03-08 Adopted CIP.

a. Fire/Rescue Station and Training Center Construction and Building Renovations

The Department of Fire and Rescue Services has a total of 19 fire and rescue stations. Six additional stations will be constructed over the next 10 years. Currently funded stations are in development for South Riding; the Broadlands area; and the Dulles/Rt. 28 area. In the 2003-2008 CIP, additional stations are planned for voter referendum in western Loudoun area in FY 05; Brambleton area in FY 07; and Lansdowne area in FY 08. Each of the projects is dependent on the approval of a bond referendum in the corresponding fiscal year.

The Capital Improvement Program (CIP) station identification location is appropriate in that it has identified the necessary stations to be constructed. Even though the adopted FY 2003-2008 plan indicates a specific year for each project, that is the year that funding will be available for planning and construction. This essentially puts the actual opening of a station two years or more beyond the date listed. In several cases, this can be problematic in Loudoun County.

Station construction, location and projected construction dates should be based on several factors. The demand for service and response times should be the driving force for determining the order of construction. It is logical that areas experiencing rapid growth, or projected to experience rapid growth, should have a higher priority than stations in areas that do not have as high of a service demand. The adopted CIP plan has stations that are located in high service demand areas planned for construction after stations that have a lower service demand. The service plan highly recommends immediate consideration of revision to the current CIP program during FY 04 budget deliberations, to reflect station construction in areas that are experiencing growth and increased call demand prior to other stations with a lesser call demand.

In order to have the maximum impact on the County system and to reduce response times to areas with a higher service demand, the funding of stations should be changed to the following: Brambleton Station should be moved to a FY 04 instead of FY 07, the Lansdowne Station should be moved to FY 05 instead of FY 08, and Western Loudoun should be constructed after FY 09 instead of FY 05.

The Brambleton and Lansdowne Stations are planned for communities that will be well developed before the station is constructed. Therefore, there will be longer response times and a higher service demand placed on existing stations. This will have a domino effect as existing stations will have a higher probability of being assigned to calls in the new growth

areas and therefore will have less availability for emergency calls in existing response areas. The proposed changes to the CIP will provide a higher value to the entire fire and rescue system than the currently planned construction schedule.

The service plan depicts the dates that are adopted by the Board of Supervisors; however, serious consideration should be given to amending the dates as presented as part of the service plan.

Fire Station Renovations

Renovations to fire and rescue stations are necessary to maintain the buildings in an operable condition. Currently, all fire and rescue stations are owned and maintained by the volunteer organizations. Because of the increased difficulty in raising funds, it is recommended that the County assume a capital improvement program for existing stations.

Fire and rescue stations are built in strategic locations and are typically designed to last for many years, typically for more than 50 years. When stations were built in previous times, Loudoun County was a rural County that depended totally on volunteers for fire and rescue services. Volunteers did not spend shifts of time at the station waiting for calls, but normally came to the station for emergency responses and for organization functions such as meetings or fund-raising activities.

In 2003, it is almost mandatory for suburban departments to have personnel on stand-by in the stations. This increases the responsiveness to emergency incidents and reduces the response times to acceptable levels. To have this level of service requires facilities that have the necessary amenities to support continuous occupancy. This includes office space, kitchen, lounge, bunkrooms, single sex locker rooms and sleeping areas.

The adopted FY 2003-2008 CIP projects that station renovations begin no sooner than FY 2008. Given the increased demand for service, this time frame will create a situation whereby facilities are inadequate for personnel to comfortably stand-by and bunk at the station, as deemed necessary to meet acceptable response goals.

It is recommended that the CIP be reviewed and that several stations be renovated each year depending on costs. This will result in station renovations to be completed in a more timely manner than the current plan of no renovations beginning 2008 or later. The cost of this service level is unknown as planning has not been completed to ascertain which stations should be renovated first.

Fire-Rescue Training Center Expansion

This project was funded in FY 00 and permits expansion of the Fire-Rescue Training Center beyond the existing "Phase 1" construction. This will provide expanded classroom/administration/9-1-1 center space and essential specialized training facilities.

Construction should be underway by mid-2003, following approval of the Shellhorn Property Master Plan and any related special exception process and clarification of opportunities and limitations with respect to water and sewer utilities to serve project facilities. Inaccessibility of municipal utilities could add more than $300,000 to the project budget.

Budget Summary

The following chart summarizes the current and proposed construction schedule and cost for Fire Station Construction and Renovation and for Training Center Construction. The cost of each project is indicated for review only and it is understood that debt management and appropriations will dictate some of the construction time frames.

Loudoun County Department of Fire and Rescue Services
Capital Project Spending as Adopted in 2003-2008 CIP

Facility	Prior Alloc.	FY 03	FY04	FY05	FY06	FY07	FY08	Future Yrs	Project Totals
$ in Thousands									0
South Riding Fire/Sheriff		4,900							4,900
Broadlands Fire/Sheriff	1,110	4,230							5,340
Dulles/Rt 28 Fire/Sheriff		840	7,065						$7,905
Western Loudoun Fire/Sheriff				890	7,740				$8,630
Brambleton Fire/Sheriff						840	7,020	1,625	$9,485
Landsdowne Fire/Sheriff							485	5,490	$5,975
Training Center	7,570								$7,570
Station Renovations						350	1,870	12,460	$14,680
Totals by Year	**$8,680**	**$9,970**	**$7,065**	**$890**	**$7,740**	**$1,190**	**$9,375**	**$19,575**	**$64,485**

Loudoun County Department of Fire and Rescue Services
Capital Project Spending as Recommended by Service Plan

Facility	Prior Alloc.	FY 03	FY04	FY05	FY06	FY07	FY08	Future Years	Project Totals
$ in Thousands									0
South Riding Fire/Sheriff		4,900							4,900
Broadlands Fire/Sheriff	1,110	4,230							5,340
Dulles/Rt 28 Fire/Sheriff		840	7,065						$7,905
Western Loudoun Fire/Sheriff							890	7,740	$8,630
Brambleton Fire/Sheriff			840	7,020	1,625				$9,485
Landsdowne Fire/Sheriff				485	5,490				$5,975
Training Center	7,570								$7,570
Station Renovations			350	1,870	4,000	4,000	4,460		$14,680
Totals by Year	**$8,680**	**$9,970**	**$8,255**	**$9,375**	**$11,115**	**$4,000**	**$5,350**	**$7,740**	**$64,485**

b. Fire and EMS Apparatus Expenditures

Effective emergency response requires that vehicles be in service and in a condition to withstand the rigors of emergency work. This places a heavy burden on the department to assure that all vehicles are in a state of constant readiness and that the vehicles meet all safety requirements in order to realize an uneventful response under emergency conditions. Emergency response places a tremendous stress on vehicles. The use of technology can lessen the stress on vehicles; however, the ever-increasing complexity of the electrical systems and on-board computers make routine maintenance a necessity. Further, upon arrival at the scene, the equipment on the vehicles must be in a state of readiness and able to operate under the harshest of conditions. A good apparatus replacement program plan will allow the department to maintain a quality fleet of emergency vehicles and state-of-the-art emergency equipment.

Unfortunately, there is no national standard for emergency vehicle replacement. Model programs exist that use mileage as the determining factor. Other model programs use age of the vehicle. Still others utilize a combination of factors including mileage, age, cost of repairs, hours of operations, etc. Based on the fact that technology changes over a period of years regardless of the amount of service time a vehicle is used, older vehicles are less likely to have modern technology that may be safer and more efficient. Therefore, age is a definable means that can be used to develop a set plan for emergency vehicle replacement.

Given that the service plan uses years of service as the determining factor, the replacement ages must be determined. The advances in technology today changes so rapidly that over a 10-15 year period, almost all of the complex systems on an emergency vehicle will be outdated and unable to provide the latest safety measures for responding personnel. Even though the age of the vehicle should not be the only determining factor, it is one that can be easily administered and assures that the technology is updated on a periodic basis. Localities that use age as a factor replace vehicles that are anywhere from 10-15 years old. Although local use will dictate more definitive life expectancies, as a guide the maximum effective life expectancy of vehicles is recommended as follows:

Engines ..... 12 years

Ladder Trucks ..... 15 years

Tankers ..... 20 years

Heavy Rescue..... 20 years

Brush Trucks ..... 20 years

Specialty Units..... 20 years

(*this includes vehicles such a light units, attack pumpers, etc.*)

Ambulances (normal chassis) ..... 5 years

(medium duty chassis) ..... 10 years

The estimated cost of vehicles in 2002 dollars is as follows:

A. Engines ..... $375,000 equipped

B. Ladder Trucks ..... $750,000 equipped

C. Tankers ..... $250,000 equipped

D. Ambulances ..... $175,000 equipped

E. Heavy Rescue ..... $425,000 equipped

Currently, Loudoun County does not purchase vehicles but depends on the volunteer organizations to purchase emergency vehicles for their respective stations. This service plan institutes a program whereby the County begins to budget necessary funds to purchase at least one primary fire vehicle and one primary EMS vehicle annually. Further, given the high cost of ladder trucks, the County should plan on purchasing all new ladder trucks and replacing existing ladder trucks as they are in need of replacement.

In some cases, the volunteer companies may select to continue their purchase of vehicles. However, the increasing costs of vehicles along with the increased service demands on those vehicles has the potential to create a situation whereby the County must assume full responsibility for purchasing primary response vehicles. Should a volunteer company wish to continue purchasing its own vehicles, the County will have less of a budget expenditure in that budget year.

Reserve Fleet

A reserve vehicle fleet is crucial to maintain adequate vehicles in the system. The reserve fleet is in place in order to have vehicles that can be available as replacements when vehicles are out of service for repairs or maintenance. The American Public Works Association indicates that the generally accepted practice is to have a reserve fleet of 10 percent of the vehicles that are mission critical as reserve units. The U.S. Army utilizes a factor of 8-15 percent to determine a reserve fleet. Based on these findings, it is recommended that Loudoun County utilize a ten (10) percent factor for reserve units. Based on this factor, the County should have a minimum of three reserve engines, three reserve ambulances and one reserve ladder truck. Given that the service plan does not address the purchase of tankers, brush trucks and rescue squads, it will be incumbent upon the Chief of the Department of Fire and Rescue Services to develop a means to assure that adequate vehicles are in place when these vehicles go out of service.

In order to implement a reserve fleet, it is recommended that an agreement be made with the volunteer organizations that when the County takes delivery of a County-purchased vehicle for that station, the volunteers may sell the replaced piece to the County at a determined cost to add to a reserve fleet. Engines and ambulances will then be managed to assure that the reserve fleet will be equal to 10 percent of the first-line fleet for engines, ladders and ambulances. Every year, a determination should be made as to the best vehicles in the reserve

fleet. Vehicles that are out of serviceable life spans will be surplused in accordance with County procedures.

In addition to the County's reserve fleet, the system also has the ability to utilize other vehicles that are in the station where the vehicle going out of service is assigned. In the event that a reserve vehicle is not available and there are no other serviceable vehicles in the home station, a process should be in place to reposition an appropriate piece from other County stations.

Additional Ladder Truck

The County currently has three ladder trucks that operate as truck companies. The geographical spacing of these companies appears to be appropriate given three ladder trucks. There are no nationally accepted standards to determine the number of ladder trucks for a locality. The decision must be based on the number of large facilities in the locality, the type of buildings, such as apartments, condos, office buildings, and the number of large retail facilities such as shopping malls. The goal should be to have ladder trucks readily accessible to high- and special-risk areas.

It is not cost effective to have ladder trucks in stations that are in immediately adjoining stations when there is not a high number of high- and special-risk properties. Based on population density, large facility locations, accessibility and projected growth, this service plan recommends that a ladder truck be incorporated into the Broadlands Station after it goes into service.

This station is in a high property value area with the potential for a large economic loss should a commercial property sustain considerable damage. The vehicle is also then able to serve Cascades, Ashburn and backup for Sterling as the first due ladder truck, thus reducing the impact on the other three ladder trucks in the County. The location is also readily accessible to the Greenway and other major transportation routes in the County. In addition, the capacity for ladder companies will have been expanded by 33 percent and allow for multiple ladder company responses while still maintaining available ladder trucks in the County.

The station is projected to be operational in FY 05. Funding will be shown for FY 05 in the field services budget. There are currently plans being made by the volunteer fire company at Ashburn to purchase a ladder truck for this station. If the volunteers purchase this truck, the cost of vehicle will not need to be funded by Loudoun County.

Apparatus Replacement Plan

Given these parameters, the following capital purchases for vehicles should be required for the fiscal years indicated:

For financial planning purposes, the average expenditure for vehicles over the next five years is $925,000. Future planning would dictate that a $925,000-per-year replacement plan be

established and funded in order to maintain an adequate fleet of reliable vehicles. This would require the early replacement of some vehicles and the delayed replacement of some vehicles in order to get on a replacement cycle. The long-term payoff for this approach will allow the County to have a consistent funding request each year for fire and rescue apparatus.

Apparatus Replacement Budget

Fiscal Year	Vehicle To Be Replaced	Replaced Vehicle $
FY04	W5	375,000.00
	W8	375,000.00
	W16	375,000.00
		$1,125,000.00
FY05	W10	375,000.00
	W4	375,000.00
	A4-1	175,000.00
		$925,000.00
FY06	A6-2	175,000.00
	A9-2	175,000.00
	A3-2	175,000.00
		$525,000.00
FY07	A13-2	175,000.00
	TR11	750,000.00
		$925,000.00
FY08	TR1	750,000.00
	W18	375,000.00
		$1,125,000.00

Average Cost Per Year	$925,000

2. Operating Needs

Based on 2003 projections, the population of the County will be approximately 215,000 in 2003. By the end of the five-year period (FY 08) that is covered by the detailed part of the plan, the population will be at 280,000, an increase of more than 65,000. At the end of a 20-year period, FY 22, the population will have a projected total of 411,000. That is almost a 100 percent increase. This will place a tremendous burden on the fire and rescue system, and good planning and execution is critical in order to provide quality emergency services protection.

Population Projections 2000-2022

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Population	169,599	185,879	200,274	214,726	229,193	242,398	255,631	267,663	279,695	291,739	303,807	315,875
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	
Population	325,947	335,519	345,091	354,663	364,234	373,274	380,988	388,729	396,470	403,942	410,615	

The following chart depicts the projected incident increases over the next five years. Based on a historical increase of approximately five (5) percent per year, the projected incident load in the year 2022 will be more than 35,500 emergency incidents.

Incident Projections over a Five Year Period

	1998	1999	2000	2001	2002#	2003#	2004#	2005#	2006#	2007#	2008#
EMS	9,113	9,800	10,633	11,647	12,300	12,533	13,124	13,715	14,306	14,897	15,488
FIRE	3,219	3,986	4,230	4,745	4,881	5,118	5,417	5,716	6,015	6,313	6,612
PUB SERV/OTHER	980	2,088	1,830	1,862	1,216	1,831	1,787	1,744	1,701	1,658	1,614
Grand Total	13,312	15,874	16,693	18,254	18,397	19,482	20,328	21,175	22,022	22,868	23,714

(*EMS, Fire and Pub. Serv./Other Incident increase based on linear regression)
(# Projections)

a. Service Level Development

Determining service levels give Loudoun County the ability to measure its performance of the delivery of service to its citizens based on the ability to place adequate numbers of personnel on emergency scenes within prescribed time frames. Every community is different in that ability; however, there are accepted standards such as EMS survival rates from the American Heart Association and Flashover Curves as indicated by the National Fire Protection Association (NFPA). These standards outline activities that must be performed within time frames in order to have a better outcome for the person or the building.

The current Loudoun County response goals are not based on known nationally accepted practices or standards.

The following standards are currently in place: (turnout time is defined as the time from dispatch until the vehicle leaves the station).

Fire Companies	**Rescue (EMS) Companies**
Fire Incidents–6 minute turnout	ALS Incidents–3 minute turnout
EMS Incidents–5 minute turnout	BLS Incidents–5 minute turnout
	Fire Incidents–6 minute turnout

Though these turnout times may fit the capabilities of the system, the hallmarks of fire response (control of flashover) and emergency medical services (initiating CPR, early defibrillation and advanced life support care) cannot be consistently and reliably met by some stations that are currently in compliance with existing County standards.

The turnout time measurement is only one component of total response time and does not give an indication of how long it takes to have appropriate personnel arriving on the scene of an emergency. The current goals are exceptionally long and can impact the timely delivery of on-scene arrival of emergency vehicles within acceptable time periods.

A total response time can be defined as the time it takes from when a dispatcher answers a 9-1-1 call until a trained emergency responder is at the patient or in a building. Response time is comprised of the following components:

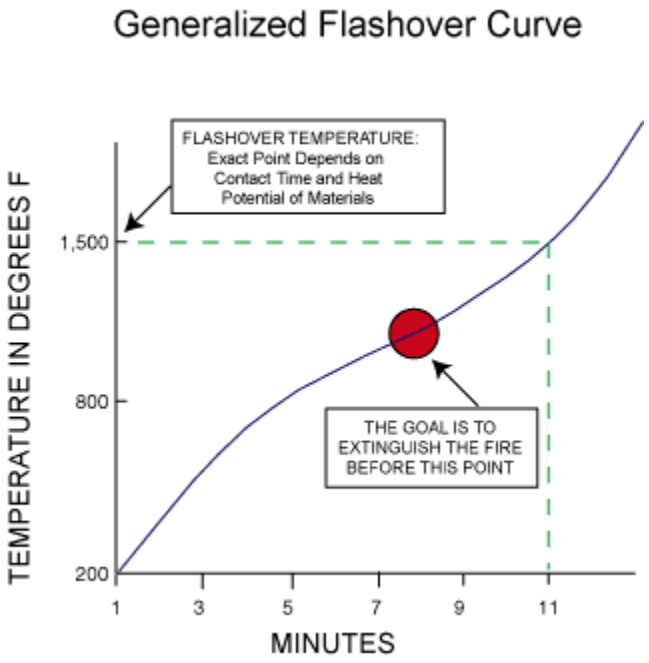
Call processing time—Time from 9-1-1 receipt until units are dispatched (standard is one minute)
Turnout time—Time from dispatch until units are leaving the station (standard is one minute)
Travel time—Time from leaving the station until units arrive at the scene (varies according to station placement)
Set-up time—Time to gather equipment and proceed to the actual site of the emergency (varies depending on type of incident, but normally 1-3 minutes)

Dispatch Requirements

The time for a dispatcher to answer a 9-1-1 call, solicit information from the caller, enter the information into the CAD system and dispatch the appropriate units adds time to the response continuum that impacts the outcome of the incident. Even though many systems do not measure dispatch-processing time, it is imperative that this number be counted in order to get a true picture of the length of time from an emergency occurring to a fire-rescue vehicle arriving at the scene of the emergency. The national standard for call processing is normally calculated at 60 seconds, and this should be the level of service provided in Loudoun County. (NFPA 1710)

Fire Requirements

In order to have an aggressive fire suppression program, units must be able to apply water to a fire prior to the point of flashover. Flashover occurs anywhere from four (4) to eleven (11) minutes after the fire begins. This is dependent on the intensity of the fire and the materials that are burning within the structure. When the room bursts into flame, flashover has occurred. The scientific definition of flashover states that it is caused by the radiation feedback of heat. Heat from the growing fire is absorbed into the upper walls and contents of the room, heating up the combustible gases and furnishings to their auto-ignition temperature. This build up of heat in the room triggers flashover.



Flashover is the point at which the contents a room or structure is heated to the point at which the contents of the room will all become consumed with flames. It is the end of an effective search and rescue in a room; it means the death of any person trapped in the blazing room—either civilians or firefighters. It signals the end of using a portable extinguisher to extinguish the fire; an attack hose-line is required after flashover occurs. It signals the end of the growth stage and that the fire is in the second stage of combustion—the fully developed stage. Finally, flashover signals the change from contents to a structure fire. This is the beginning

of the collapse danger. Structural collapse potential starts in the fully developed stage and becomes the greatest in the decay stage of a fire—after the fire has been extinguished.

Having a rapid response time to meet these demands requires a rapid turnout time. A standard one-minute turnout time is generally accepted and can be met with personnel on stand-by in stations. This is not feasible or realistic in all cases, but every minute of turnout time reduces the acceptable response time by an equal amount. The essential requirement is to get personnel on the scene within prescribed time frames, so each station can determine how to best meet the full response time objectives.

In order to intervene effectively in the fire scenario, fire suppression must begin prior to flashover, normally within approximately eight minutes after being dispatched. Once flashover occurs, fires expand exponentially, which means the fire will double every second after flashover has occurred. This fire expansion causes more property damage, and creates less chance of civilian survival and increases the potential for firefighter injuries. So the goal is to intervene prior to flashover occurring. (NFPA 1710)

Thus, the goal for fire suppression to have units on the scene and fighting a fire is within established time frames as outlined below. This gives units time to assemble on the scene and to advance to the seat of the fire. In high-risk occupancies, the time to locate the fire is longer, and thus a quicker response time is needed to set up and to advance to the seat of the fire.

This response time is not realistic countywide, but a risk assessment will point to the fact that areas with lower risk can have a longer response time, but the tradeoff is that fires may cause more property damage to the property that is consumed in fire. These properties do not adjoin other properties and therefore there is a low probability of fire extending to other properties and creating property damage beyond the building that is initially on fire. Thus, there is a lower risk to the community as a whole and a longer response time does not have as much of a community impact. In comparison, a fire in an apartment unit can extend to other units and have an impact on multiple residences and citizens. This results in a large impact on the community as a whole and thus a faster response time is required to lessen the impact on the community.

Fire Risk Levels

The service levels outlined are based on a risk analysis of areas and buildings in the County. A risk assessment is an analysis of the threat to a community from any type of natural or man-made disaster. It can be fairly simple and look at buildings or areas based on size or function, or it can be a very complex process that evaluates size, building construction, economic impact on the community, fire suppression systems, water supply, occupancy, etc.

The Department of Fire and Rescue Services must determine what types of structures and areas fit into the categories below; however, the following general categories allows the department to evaluate response times based on their response to levels of risk. In essence, response to a higher risk is more critical to the citizens and the community than is a low risk. In addition, higher risk areas and buildings are typically

in more populated areas and are located closer to a fire and rescue station, thus a quicker response time.

- Low Risk — Forest lands with no wildland interface, barns, sheds, dumpsters, grasslands, vehicle fires, tractors and vehicle accidents.
- Medium Risk — Single family homes, small town home complexes, strip malls, small retail facilities, churches and multi-casualty accidents.
- High Risk — Apartment buildings, shopping malls, airports, mid-rise buildings, nursing homes, government facilities, jails, hazardous materials sites, confined spaces, schools.
- Special Risk — Computer processing center (AOL), potential for large loss of life such as unsprinklered nursing homes, and any other area or property that would have a significant impact on the tax base should the property be destroyed or severely damaged.

b. Staffing Levels

Number of Personnel on Pumpers/Ladder Trucks

Staffing levels are currently based on three-person staffing for pumpers, ladder trucks and heavy rescue companies. Ambulances have minimum staffing of two people. First response vehicles and tankers have a minimum staffing level of one person.

Increasing staffing on pumpers, ladder trucks and heavy rescue squads to four people can increase service levels for fire responses by more than 100 percent. According to the Virginia Department of Labor, units must operate in teams of two, so three-person staffing on vehicles allows for one team of three to be deployed. A four-person minimum staffing level on mission critical pieces allows for two teams of two to be deployed, thus a 100 percent increase in capacity. The Virginia Department of Labor also requires that a rescue team (Rapid Intervention Team) be in place prior to firefighters entering a dangerous fire situation. This rescue team must be comprised of two people. This means that in order for a team (two people) to enter a burning building, another team (two people) must be on standby to perform firefighter rescue should the team in the building become incapacitated. Thus, four people are required on a scene prior to initiating fire attack.

In addition, NFPA 1710 requires that four people be assembled on the fire ground prior to undertaking fire suppression activities. Four-person staffing allows for immediate action at all fire scenes. The Northern Virginia Regional Response Agreement also has a goal of all responding companies to have a minimum of four-person staffing. Four-person staffing on all Loudoun County fire apparatus will allow Loudoun County to be in compliance with other Northern Virginia jurisdictions, and facilitate the mutual aid and mutual response agreements.

This service plan moves to develop a four-person staffing scenario by increasing the number of volunteers in each company and to increase career staffing on each engine so that four-person staffing can be incorporated into policy by 2008.

Ladder Truck Staffing

Staffing ladder trucks also must be addressed. Staffing is currently provided for the ladder truck at the Sterling Station. In all other stations, personnel are assigned to a station and respond on whatever piece of equipment is the primary response unit for the type of incident dispatched. This method of assignment does not, in the absence of available in-station volunteer staffing, allow for a ladder truck to respond immediately with a pumper to reports of structure fires. While the pumper can begin fire suppression activities without a ladder truck, the functions of a ladder truck—search and rescue, ventilation, utility control, etc.—must be accomplished by the personnel on a pumper, preventing them from concentrating efforts directly on establishing a water supply, extinguishing the fire and preventing fire spread.

Twenty-one additional personnel are recommended to staff ladder trucks, including the additional ladder truck recommended as part of this service plan.

Staffing Thresholds

Nationally or generally accepted standards that would assist with determining when volunteer stations would need assistance from career staffing are not available. The International City/County Management Association (ICMA) reports that cities of approximately 250,000 have staffing factors that range from .5 to 2.7 per thousand residents, with the average being 1.0 to 1.5 per thousand residents. However, one size does not fit every locality. Every locality addresses the issue differently based on the characteristics of the community, service demands, risk assessment and volunteer participation in their own community.

This service plan recommends that two items be considered when determining staffing. The service levels are based on looking at the level of service that Loudoun County wants to deliver to its citizens. The numbers can be changed; however, there will be impact on the citizens in terms of possible loss of life and additional property damage.

The first factor to consider is the number of responses that a station or company makes per month. A factor of 30 calls per month is equivalent to one incident per day in that response area. The second factor to consider in staffing is response time. If a company falls below a 70 percent compliance (for more than three months) with the goals established in this plan, and the company responds to more than 30 calls per month, then career personnel should be added to that station to supplement the volunteer response. This level of compliance is more than 15 percent below the accepted standard of 85 percent. Should a company fall below 50 percent compliance with the established response goals then career assistance should be implemented as

soon as possible. Companies that fall below 50 percent should be evaluated for career staff, even if the 30-incident-per-month standard is not met as more than half of the incidents are below the goals established by the County.

Even though there are no nationally accepted standards for response performance, it is imperative that reliable and consistent service be delivered to the citizens. Falling below 70 percent response time goal compliance means that 30 out of every 100 citizens that call for service are not getting an appropriate response. This is almost a third of the citizen calls for service not meeting the adopted standards. When a company falls below 50 percent compliance, then the majority of the citizens in that service area are not getting consistent or reliable service and immediate actions must be taken to assure an adequate response.

c. Fire Standards of Response Coverage Service Plan Goal Statements

The standards of response coverage are based on what can be reasonably expected based on Loudoun County Fire and Rescue Services historical information. The resource deployment recommendations are based upon the critical tasks and typical activities that must be performed by the effective initial response force.

Fire Risks

GOAL: For all calls for service, the first-due unit will maintain an average response time of less than seven minutes from the time of dispatch to time of arrival. The first-due unit shall be capable of advancing a hose line for fire control and/or rescue activities or providing basic life support procedures for medical incidents. All efficiency measurements used by Loudoun County are 85 percent.

GOAL: Loudoun County will have a dedicated Rapid Intervention Team (RIT) in place five minutes after the arrival of the first arriving unit, 85 percent of the time.

GOAL: For the respective risk classes, Loudoun County will deploy the following apparatus and staffing standards.

APPARATUS and STAFFING STANDARDS		
Type of Risk	***Assignment***	***Staffing***
Low	1 or 2 engines, 1 ambulance	5 (10)
Medium	2 engines, 1 truck, 1 ambulance, 1 BC	12 (15)
High	3 engines, 1 truck, 1 ambulance, 1 BC	15 (17)
Special	3 engines, 2 trucks, 2 ambulances, 1 BC	18 (25)

** Note: () denote preferred staffing levels, whereas numbers without () denote minimum staffing levels.*

Suburban areas in the east and rural areas (except "Urban Growth Areas" as designated in the Loudoun County Comprehensive Land Use Plan) in the west define the County. Based on geography, rural areas cannot be accessed as quickly as suburban areas are. Therefore, the standards of cover give two different fire response goal time frames based on the classification of the area served. Even though a fire grows at the same intensity and level, the threat to adjoining structures is lower and thus less of a threat for fire spread beyond the property of origin. The department will track response times based on the type of area served.

GOAL: For the respective risk classes, Loudoun County will employ the following response time objectives.

SUBURBAN RESPONSE TIME OBJECTIVES							
Type of Risk	***Response Time Goals in Minutes***						***Total Effective Response Force***
	1st E	*2nd E*	*3rd E*	*1st trk*	*2nd trk*	*1st BC*	
Low	8	10	N/A	N/A	N/A	N/A	8
Medium	6	9	N/A	10	N/A	12	12
High	5	8	10	10	N/A	10	15
Special	5	8	10	10	10	10	15

RURAL RESPONSE TIME OBJECTIVES							
Type of Risk	***Response Time Goals in Minutes***						***Total Effective Response Force***
	1st E	*2nd E*	*3rd E*	*1st trk*	*2nd trk*	*1st BC*	
Low	12	15	N/A	N/A	N/A	N/A	8
Medium	10	13	N/A	12	N/A	15	12
High	7	10	15	12	N/A	15	15
Special	7	10	15	12	20	15	15

Technical Rescue Situations

GOAL: For incidents within the County in which technical rescue services are needed, a first responder trained in technical rescue shall arrive within 20 minutes, 85 percent of the time. Mutual aid teams will arrive within 45 minutes of the time of dispatch.

GOAL: For technical rescue incidents, there shall be a team (consisting of on- and off-duty personnel) capable of performing the necessary tasks, assembled within 60 minutes, 85 percent of the time.

Hazardous Materials Situations

GOAL: For Level II hazardous materials incidents within Loudoun County, there shall be an initial team response of 12 members trained at the operations level assembled on the scene within 30 minutes of being activated, 85 percent of the time.

GOAL: For Level III incidents inside Loudoun County, there shall be a Level III team on the scene within 60 minutes, 85 percent of the time.

EMS Requirements

EMS response times are more critical in many respects than fire response times. The American Heart Association Chain of Survival outlines actions that must be taken in order to successfully resuscitate victims in out-of-hospital cardiac arrest. The measure for EMS must be considered in two different ways. The first consideration is how fast basic life support can be provided to citizens who suffer a cardiac arrest in Loudoun County. American Heart Association studies have shown that cardio-pulmonary resuscitation (CPR) must begin immediately, and in all cases no later than four to six minutes of a cardiac arrest. Early defibrillation must then follow early CPR. These actions must be followed up by advanced life support in order to provide advanced coronary care. The combination of late CPR (more than four minutes) and late advanced life support (more than 12 minutes) is particularly lethal. Several researchers have called these time dimensions the resuscitation "failure zone."

The second consideration is early advanced life support intervention for patients that are not yet in cardiac arrest but have a cardiac rhythm that will become lethal if not treated rapidly. Unfortunately, it is difficult to quantify the number of people that are saved each year by early intervention prior to suffering a cardiac arrest.

Based upon a formula developed by physicians, patient survival rates can be enhanced through training more citizens in CPR, reducing call-processing time, reducing turnout time or reducing travel time. Loudoun County can concentrate on each of the components, but the primary place to gain time is in the turnout time.

The predicted survival rate formula is as follows:

67 percent—(2.3 x time to CPR) – (1.1 x time to defibrillation) – (2.1 x time to ALS) = Predicted Survival Rate.

**Formula must add call processing time (one-minute goal), turnout time (one-minute goal), travel time, and scene set up time (one-minute goal). Full example of formula can be found at the end of the service plan.

The department can figure predicted survival rates based on the level of response that is provided throughout the County.

Based on the information above and on the two national standards in place—the American Ambulance Association uses eight minutes, 59 seconds for ALS; and the National Fire Protection Association uses eight minutes for ALS—the standards recommended reflect what is realistic in Loudoun County and still allow for an acceptable survival rate.
The rates predicted for Loudoun County is predicated on a five-minute response time for BLS with AED, and followed by an ALS response at nine minutes. Based on these response time standards, the predicted survival rate based on these response standards is approximately 16.9 percent for out-of-hospital cardiac arrests. By decreasing any of the response time components, the survival rate can be increased according to the actions taken.

d. Emergency Medical Services Standards of Response Coverage Service Plan Goal Statements

GOAL: Loudoun County will have a BLS/first responder and AED arrive on ALS calls within five minutes of being dispatched, 85 percent of the time.

GOAL: Loudoun County will have an ALS equipped unit (first responder engine or truck, medic unit, or EMS first response unit) and at least one ALS provider on any ALS-protocol EMS call within nine minutes of being dispatched, 85 percent of the time.

GOAL: Loudoun County will have a BLS ambulance staffed with a minimum of two BLS providers arrive on any BLS-protocol EMS call within 15 minutes of being dispatched, 85 percent of the time.

GOAL: Loudoun County will have an ALS ambulance staffed with a minimum of one BLS and one ALS provider arrive on any ALS-protocol EMS call within 12 minutes of being dispatched, 85 percent of the time.

e. Overall Service Plan Delivery Issue

The goals as outlined must be evaluated in order to determine current compliance. The department currently tracks response times by averages and the percent of compliance with established turnout time goals. Even though averaging gives a measurement, it simply indicates that half the time the station does better, and half the time the station does worse. The percentage of compliance gives the system a much better indicator of how the system is performing; however, the measure to determine compliance must include total response time and not just the time to get a vehicle enroute to an emergency.

Utilizing compliance rates also addresses the areas that have a very long response time, as they would be times that would be in the 15 percent non-compliant zone. Eighty-five percent was chosen as a realistic number to meet. The NFPA utilizes 90 percent as the compliance rate in NFPA 1710. Fire and EMS systems in the accreditation model utilize a compliance

rate that varies from 80 to 90 percent. An 85 percent compliance rate is within normally accepted practices and provides a realistic number for Loudoun County to attain.

f. Personnel Requirements

The combination of rapid population growth, coupled with a resulting increase in emergency incidents, will require additional resources be approved to provide fire and rescue services to Loudoun County. Many of the resources will require personnel. This chart depicts the total number of full time equivalent (FTE) positions that will need to be assigned to the Department of Fire and Rescue Services in order to meet the indicated levels of service. The total numbers indicate the number of personnel that will be required, including staffing for new stations.

Full Time Equivalent Projections

Year	Field Ops	New Stations**	EMS/Volunteer Coordination and Support	Training	Fire Marshal's Office	Communications	Planning/ Admin	Total FTE
2003	198.06		1.7	10.93	15.29	28.85		254.83
2003 Serves as baseline, additional positions shown below								
2004	28.00		0.50	6.72		4.48	3.00	42.70
2005	21.28	26.88	1.00	6.72	2.24		1.00	59.12
2006	16.24	26.88		3.36	2.24	0.56	0.50	49.78
2007		26.88	1.00					27.88
2008	17.92				2.24			20.16
Total	281.50	80.64	4.20	27.73	22.01	33.89	4.50	
				Total Full Time Equivalents				**454.47**

**Firefighters needed if no volunteer organization with necessary staffing levels in new stations

The EMSSTAR report identified recommended service levels that should be the standard for Loudoun County. The budgetary needs of the recommended levels are shown in the next section.

To establish a baseline, operating needs are based on the following assumptions and projections. For ease of use, the following assumptions will be used throughout this section, unless otherwise specified.

1. Financial information is based on the adopted FY 03 budget.

2. Inflation factor of three (3) percent is used for future projections in the operating budget. The first year of any new program is based on 2003 dollars; thereafter, there is a three percent inflation factor used.

3. New programs or program expansions are indicated in separate budget charts to allow for easy identification. However, the total cost per year is based on the base budget, plus the additional funds needed for the program expansion.

4. Career staffing levels are based on providing a one-fire response unit with a minimum staff of three, and EMS units with a minimum staff of two. However, a plan is recommended to increase all staffing levels four persons per apparatus.

5. The operational cost for one volunteer is $1,142 per year. This includes all direct costs to the County including: Length of Service Program, Personal Property Tax Program, Volunteer Medical and Loss Pay, Disability and Life Insurance.

6. The cost for one career firefighter/EMT is $55,000 per year for the FY 04 and then $50,000 for future years. Each of these figures is adjusted for inflation commencing FY 05.

7. The cost to staff a fire station five days per week, 12 hours per day with five career personnel staffing a pumper and ambulance is $554,400, which funds nine firefighters = 10.08 FTEs.

8. The cost to staff a fire station seven days a week, 12 hours per day with five career daytime personnel staffing a pumper and ambulance is $862,400, which funds 14 firefighters = 15.68 FTEs.

9. The cost to staff a ladder truck for five days per week, 12 hours per day with four career firefighters is $431,200, which funds seven firefighters = 7.84 FTEs.

10. The cost to staff a fire station with five 24-hour career personnel staffing a pumper and ambulance is $1,478,400, which funds 24 firefighters = 26.88 FTEs.

11. The cost to staff a rescue company five days per week, 12 hours per day with career personnel for one ambulance is $246,400, which funds four personnel = 4.48 FTEs.

12. Personal protective equipment is based on a five-year replacement program. One full set of protective clothing is based on $1,000 per set.

13. Station placement is predicated on a five-minute travel time in suburban areas, and 10-minute travel times in rural areas per the 2.5 mile and 5.0 mile coverage radius standard depicted earlier in the EMSSTAR study.

14. The yearly cost to maintain one primary emergency vehicle is $15,000. This includes fuel, oil and maintenance. The cost to maintain one car or utility vehicle is based on $10,000 per year.

15. Volunteers may continue to purchase all of their emergency vehicles at no cost to the County. However, cost figures are based on a purchase plan that will pay for one fire, one EMS and appropriately located ladder trucks in stations as units need to be replaced.

The following operational projections are sorted by program then by fiscal year for the next five fiscal years.

g. EMS/Volunteer Coordination and Support

Highlights of Programs
Maintaining the service levels in this program will require a multi-faceted approach. Volunteers must be recruited and retained in order to deliver services to the community. This will require a combination of several program areas to include a quality, flexible schedule training program, administrative assistance through record keeping and an aggressive recruitment program administered by the County. Failure to maintain and/or increase volunteer participation will have an impact on field services, as additional career firefighters will be required.

Secondary to emergency response, but in all probability more critical to the long-term sustainability of the volunteers, is the elimination of the responsibility on the volunteer organizations to purchase and maintain vehicles. The cost of the initial purchase and for ongoing maintenance is rapidly escalating beyond the ability of many volunteer organizations to raise the hundreds of thousands of dollars needed to purchase state-of-the-art fire and rescue vehicles.

This projected service level will reduce and in some cases eliminate the burden for the volunteers to purchase and maintain vehicles. This reduces the burden of fund raising on the volunteer organizations and will in turn allow members to assign more efforts to providing emergency response. The County will assume the responsibility for paying for all maintenance and will be in a partnership to purchase new and replacement vehicles for the stations.

Each volunteer can realistically on the average provide 12 hours of emergency call coverage per week. Thus, providing 24-hour coverage for one fire truck and one ambulance will require 70 active volunteers. With an additional 50 percent overage to cover shifts that volunteers cannot cover due to professional and personal commitments, it can easily take 105 volunteers to provide basic coverage. This is a tremendous commitment on the part of any

community, and it becomes more difficult to provide that level of service consistently. To increase the staffing level on engines and ladder trucks to four people, each station must recruit an additional 21 volunteer members in order to increase the staffing levels to four persons per unit. This will require additional funding for all fire companies in order to adequately equip new volunteers. Recruiting approximately 63 additional volunteers each year can phase in this program over the next five years. It should be noted that these new volunteers must be in addition to the normal recruitment that is ongoing for all volunteer stations.

A part-time volunteer recruitment and retention officer program will be instituted for each station.

Services will be increased in the area of medical direction through the initiation of a paid operational medical director (OMD). This will increase the ability of the County to manage the OMD and assure that the physician meets expectations.

This service level also begins a formalized personal protective equipment replacement program to assure that safe and reliable protection is available for all personnel.

FY 2004

1. A protective clothing replacement program will be implemented based on a five-year life expectancy. This will require the purchase of 200 sets per year at $1,000 each. First-year cost is $200,000. Total recurring cost per year is $200,000.

2. A vehicle replacement plan will be implemented to purchase at least one primary fire and one primary rescue vehicle for each station as the vehicles cycle through for replacement. The cost for each year will vary according to the demands for replacement. The average cost per year over the next 10 years is $925,000. This fiscal year cost is projected at $1,125,000.

3. Increase the volunteer recruitment to allow for 63 new volunteers to be added, 21 new members for three stations to increase the staffing levels to four-person minimum for pumpers, ladder trucks and heavy rescue squads. This will be a five-year phase-in program. The first year cost will be $71,946 for volunteer benefits and $63,000 for personal protective equipment. Total recurring cost will be $71,946.

4. Establish a 0.5 full time equivalent for an EMS system medical director. The current medical director is currently serving in a non-compensated capacity. This program will compensate the medical director for the time required to have a proactive medical direction program for all fire and EMS personnel. First-year cost is $75,000. Projected recurring cost is $75,000.

FY 2005

1. A vehicle replacement plan will be implemented to purchase at least one primary fire and one primary rescue vehicle for each station as the vehicles cycle through for replacement. The cost for each year will vary according to the demands for replacement. The average cost per year over the next 10 years is $937,500. This fiscal year cost is projected at $952,750.

2. Increase volunteer recruitment to allow for 63 new volunteers to be added, 21 new members for three stations to increase the staffing levels to four-person minimum for pumpers, ladder trucks and heavy rescue squads. This will be year two of a five-year phase-in program. The first-year cost will be $74,104 for volunteer benefits and $64,890 for personal protective equipment. Total recurring cost will be $76,327.

3. Volunteer Fire and Rescue Coordinators for each station. Costs will pay to defer cost of meetings and for recruitment activities for each station. The first year cost will be $41,200. Projected recurring cost is $42,436.

FY 2006

1. A vehicle repair cost payment program will be implemented for volunteer vehicles. All volunteer units currently pay for all vehicle repairs. This program will pay for those repairs. Consideration should be given to establishing a County managed and staffed garage in future years to reduce this cost. Costs are based on an annual cost of $15,914 for large vehicles and $10,609 for smaller cars and utility vehicles. Projected first-year cost is $1,395,084. Projected recurring cost is $1,436,936.

2. A vehicle replacement plan will be implemented to purchase at least one primary fire and one primary rescue vehicle for each station as the vehicles cycle through for replacement. The cost for each year will vary according to the demands for replacement. The average cost per year over the next 10 years is $937,500. This fiscal year cost is projected at $798,250.

3. Increase volunteer recruitment to allow for 63 new volunteers to be added, 21 new members for three stations to increase the staffing levels to four-person minimum for pumpers, ladder trucks and heavy rescue squads. This will be year three of a five-year phase-in program. The first-year cost will be $76,322 for volunteer benefits and $66,837 for personal protective equipment. Total recurring cost will be $78,647.

FY 2007

1. A vehicle replacement plan will be implemented to purchase at least one primary fire and one primary rescue vehicle for each station as the vehicles cycle through for replacement. The cost for each year will vary according to the demands for replacement. The average cost per year over the next 10 years is $937,500. This fiscal year cost is projected at $1,010,772.

2. An integrated health task force will be established. This program will work with the entire health care community to develop a comprehensive approach to medical care in Loudoun County, starting with the EMS system. Projected first-year costs are based on $10,927 for the operation of a task force, and $69,115 for the cost of one paramedic to work with the task force. Total first-year cost is $80,042. Projected recurring cost is $82,443.

3. Increase volunteer recruitment to allow for 63 new volunteers to be added, 21 new members for three stations to increase the staffing levels to four-person minimum for pumpers, ladder trucks and heavy rescue squads. This will be year four of a five-year phase-in program. The first-year cost will be $78,617 for volunteer benefits and $68,859 for personal protective equipment. Total recurring cost will be $80,983.

FY 2008

1. A vehicle replacement plan will be implemented to purchase at least one primary fire and one primary rescue vehicle for each station as the vehicles cycle through for replacement. The cost for each year will vary according to the demands for replacement. The average cost per year over the next 10 years is $937,500. This fiscal year cost is projected at $1,266,197.

2. Increase volunteer recruitment to allow for 84 new volunteers to be added, 21 new members for four stations to increase the staffing levels to four-person minimum for pumpers, ladder trucks and heavy rescue squads. This will be year five of a five-year phase-in program. At the completion of this program, there should be an additional 336 volunteers in the department. The first-year cost will be $107,968 for volunteer benefits and $94,584 for personal protective equipment. Total recurring cost will be $111,178.

Service Plan Budget Projections Summary for EMS/Volunteer Coordination and Support

Program Financial Summary	FY 03 Adopted	FY 04 Projected	FY 05 Projected	FY 06 Projected	FY 07 Projected	FY 08 Projected
Expenditures:*includes Projected Programs						
Personnel	994,269	1,024,097	1,054,820	1,086,465	1,119,059	1,152,630
Operations & Maintenance	6,116,418	6,299,911	6,488,908	6,683,575	6,884,082	7,090,605
Capital Outlay	20,600	21,218	21,855	22,510	23,185	23,881
Projected Programs						
FY 04						
Protective Clothing Replacement		200,000	206,000	212,180	218,545	225,102
Vehicle Replacement Plan		1,125,000	952,750	798,250	1,010,772	1,266,197
Additional Volunteers		134,946	74,104	76,327	78,617	80,975
1/2 time Medical. Director		75,000	77,250	79,568	81,955	84,413
FY 05						
Volunteer Recruiters			41,200	42,436	43,709	45,020
Additional Volunteers			138,994	76,327	78,617	80,975
FY 06						
Vehicle Repair Program				1,395,084	1,436,937	1,480,045
Additional Volunteers				143,159	78,611	80,969
FY 07						
Health Care Task Force					80,042	82,443
Additional Volunteers					147,476	80,976
FY 08						
Additional Volunteers						202,552
Total Projected Cost	$7,131,287	$8,880,172	$9,055,880	$10,615,880	$11,281,607	$11,976,784

h. Field Services

Highlights of Programs

The primary emphasis of this program is to assure that emergency response is reliably and consistently delivered countywide. This service plan is predicated on hiring additional personnel to staff stations not currently staffed by career personnel, staff the three existing ladder trucks and adding a fourth ladder truck and the necessary staffing, and to increase the staffing on engines to a four-person minimum. All new station personnel are computed in this section and reflect 24-hour career staffing. The difficult part of this plan is being able to anticipate the staffing needs of a station beyond what is presently known. This plan will assure that adequate staff is in place over a period of time to address any deficiencies throughout the County.

This service level will not staff all existing stations on a 24-hour basis; however, should the need arise, personnel could be reassigned from existing stations to provide 24-hour coverage on an interim basis until the necessary personnel are hired.

Service levels will also increase with the initiation of a trauma system coordinator. This will allow for rapid feedback of trauma situations throughout the county and allow the department to conduct appropriate training programs based on actual experience in Loudoun County.

FY 2004

1. The addition of 25 new firefighters = 28 FTEs @ $55,000. This will allow for staffing Engine 2 (seven = 7.84 FTEs), Engine 8 (seven = 7.84 FTEs) and a ladder truck (seven = 7.84 FTEs) with four-person staffing. Rescue 14 (four = 4.48 FTEs) will then be staffed with two-person staffing. The primary intent of this addition will be to supplement daytime coverage for these stations. The response reports for FY 2002 indicate a slower turnout time than most other stations are experiencing during daytime hours. Adding these firefighters also will give the department the flexibility to meet other staffing needs that may arise that are unknown at the time of the service plan development. Total first-year cost for this program will be $1,540,000. Projected recurring cost is $1,400,000.

FY 2005

1. The addition of 43 new firefighters = 48.16 FTEs @ $56,650 each. This staffing will staff one ladder truck with four-person staffing (seven = 7.84 FTEs), Rescue 17 (four = 4.48 FTEs), and increase the staffing on four engines to four-person minimum (eight =8.96 FTEs). This is the second year of a program to bring all engine staffing up to four people. Rescue 17 has a low call volume, but response times and turnout times are not in keeping with other stations in the County. The program will also provide career staffing for the Broadlands Station (24 = 26.88 FTEs) upon

completion. Total first-year cost for this program will be $2,728,264. Projected recurring cost is $2,480,240.

FY 2006

1. Institution of a trauma systems coordinator position. This position will be a 0.56 FTE position that works with the County hospitals and other regional hospitals. The primary purpose of this program is to provide feedback to the hospitals and to pre-hospital care providers. A primary responsibility will be to monitor hospital diversions and trauma care systems in the County. Projected first-year cost is $37,100. Projected recurring cost is $37,100.

2. The addition of 38 new firefighters = 42.56 FTEs @ $58,350 each. This will allow for the assignment of four-person minimum staffing for seven additional engines (14 = 15.68 FTEs). This will be the last year of a three-year program to bring all engines up to four people. Additional staffing is planned for the Dulles/Rt. 28 Station (24 = 26.88 FTEs includes engine and ambulance). Total first-year cost for this program will be $2,483,376. Projected recurring cost is $2,257,595.

3. Purchase of a fourth ladder truck for the County. This truck will be assigned to the Broadlands Station upon completion. This will give the County a total of four ladder trucks. Positioning the ladder truck at this station will provide a higher level of protection to the large campus facilities and high property values in the Dulles corridor. In addition, this truck can respond to the Cascades, Ashburn and as back-up for the Sterling sections of the County. First-year cost is $795,675. Projected recurring cost is $15,914.

FY 2007

1. The addition of 24 new firefighters = 26.88 FTEs @ $60,101 each. This will allow for the assignment of 24 = 26.88 FTEs to the Lansdowne Station. If the service plan is fulfilled as designed, all stations except Station 16 will have career personnel. South Riding, Leesburg Rescue, and potentially the Broadlands and Dulles/28 Stations will have 24-hour personnel. These FTEs will be designated to increase 24-hour staffing in the new station when it opens. Total first year cost for this program will be $1,615,515. Projected recurring cost is $1,468,616.

FY 2008

1. The addition of 16 new firefighters = 17.92 FTEs @ $61,904 each. This number of staff will supplement a career daytime force to provide for 24-hour coverage at a station that may not be meeting response objectives. In FY 02 and FY 03, unexpected service demands were placed on the department when staffing requests were made. Due to the uncertainty of how the system will mature, it is not possible to select a station for these personnel at the time the service plan is developed. However, it is important to plan toward adding the necessary personnel to meet response time goals. Personnel will not be requested in this budget year if all service demands are being met. Total first-year cost for this program will be $1,109,320. Projected recurring cost is $1,008,448.

Service Plan Budget Projections Summary for Field Services

	FY 03	FY 04	FY 05	FY06	FY 07	FY 08
Program Financial Summary	**Adopted**	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**
Expenditures:						
Personnel	10,789,739	11,113,431	11,446,834	11,790,239	12,143,946	12,508,265
Operations & Maintenance	1,183,316	1,218,815	1,255,380	1,293,041	1,331,833	1,371,788
Capital Outlay	199,612	205,600	211,768	218,121	224,665	231,405
Total 2003 plus inflation	12,172,667	12,537,847	12,913,982	13,301,402	13,700,444	14,111,457
FY 04						
25 Firefighters		1,540,000	1,400,000	1,442,000	1,485,260	1,529,818
FY 05						
43 Firefighters			2,728,264	2,480,240	2,554,647	2,631,287
FY 06						
38 firefighters				2,483,376	2,257,595	2,325,323
1/2 time Trauma Coordinator				37,100	38,213	39,359
Ladder Truck for Broadlands Station				795,675	15,914	16,391
FY 07						
24 Firefighters					1,615,515	1,468,616
FY 08						
16 Firefighters						1,109,320
Total with Projections		$14,077,847	$17,042,246	$20,539,793	$21,667,588	$23,231,571

i. Fire Marshal's Office

Highlights of Programs

The service level changes in this program address the growth of the County businesses and the resulting demand for fire inspections to be completed. In addition, as the number of fire responses increase, there will be an increasing demand that fires be investigated to determine the cause of the fire.

Increased service levels will put appropriate supervisory staff in place to more efficiently manage the activities of the office. The completion of this level will bring the Fire Marshal's Office in line with other divisions within the department.

A significant increase in service levels will be readily apparent in this program through the implementation of a quality records management system as outlined in the communications section of this plan. It is essential that data and information be readily available in order to effectively track and manage fire inspections and investigations. Implementing a portable computer program for all inspectors can further increase inspection efficiency.

Training field personnel in fire inspections and implementing a company fire inspection program will increase service levels. The goal of this program should be to complete all business inspections in the County within time frames established by the fire marshal.

FY 2004

1. The implementation of a company inspection program will necessitate that personnel be trained in conducting inspections. Adequate software programs must be in place to track inspections and record the results of inspections. First-year cost is projected to be $100,000 for software and $60,000 for inspector training. Projected recurring cost is $30,000 for software maintenance and continuing education.
2. Portable/hand-held computers will be provided to allow inspectors to access records and files during inspections and to record the necessary fire code violations. First-year cost is projected to be $150,000 for 15 computers. Recurring cost is estimated at $25,000.

FY 2005

1. The addition of two fire inspectors/investigators = (2.24 FTEs) @ $59,440 each will increase the number of inspections and investigations that are completed within prescribed time frames. An additional 1,500 inspections per inspector should be realized by this increase in staffing levels for a net gain of 3,000 inspections per year. The first-year cost is estimated at $103,000 for two vehicles, $20,600 for computers, $10,300 for office equipment and supplies, and $118,880 for salaries and benefits. Total first-year cost is $252,780. Projected recurring cost is $129,180.

FY 2006

1. The addition of one fire inspector = 1.12 FTEs @ $61,223 and one lieutenant = 1.12 FTEs @ $69,734. This service level will increase the number of inspections by almost

1,500 and give a supervisory level that will coordinate and manage the day-to-day inspection program. The first year cost is estimated at $106,090 for two vehicles, $21,218 for two computers, $10,609 for office equipment and supplies and $130,957 for salaries and benefits. Total first-year cost is $268,874. Projected recurring cost is $141,566.

FY 2007

1. This program will be enhanced by the implementation of a fire suppression system testing section. The majority of buildings with suppression systems will be approaching 25 years old. The incidence of malfunctions and failures historically rise as a building ages. This program will assure that systems are properly tested under non-emergency conditions and can serve to correct deficiencies that could result in a loss of property and possibly life. This service level will utilize part time fire inspectors to monitor and evaluate the system tests. First-year cost is projected to be $54,636. Projected recurring cost will be $54,636.

FY 2008

1. This level will provide one fire inspector/investigator = 1.12 FTEs @ $64,952 and one battalion chief = 1.12 FTEs @ $84,418. The number of inspections can be increased by approximately 1,500. The addition of a battalion chief will give the Fire Marshal's Office the ability to divide job duties and responsibilities and to assure that all section personnel are undertaking appropriate actions. The first-year cost is estimated at $119,304 for two vehicles, $22,510 for two computers, $11,255 for office equipment and supplies and $149,370 for salaries and benefits. Total first year cost is $302,439. Projected recurring cost is $160,625.

Service Plan Budget Projections Summary for Fire Marshall's Office

Program Financial Summary	FY 03 Adopted	FY 04 Projected	FY 05 Projected	FY06 Projected	FY 07 Projected	FY 08 Projected
Expenditures:						
Personnel	$1,128,942	$1,162,810	$1,197,695	$1,233,625	$1,270,634	$1,308,753
Operations & Maintenance	$284,122	$292,646	$301,425	$310,468	$319,782	$329,375
Capital Outlay						
Total 2003 plus inflation	$1,413,064	$1,455,456	$1,499,120	$1,544,093	$1,590,416	$1,638,128
FY 2004						
Company Inspection Program		160,000	30,900			
Portable Computers		150,000	25,750	26,523	27,318	28,138
FY 2005						
Fire Inpsectors			252,780	129,180	133,055	137,047
FY 2006						
Fire Inspector and Lieutenant				268,874	141,566	145,813
FY 2007						
Part Time System Inspectors					54,636	56,275
FY 2008						
Fire Inspector and Battalion Chief						302,439
Total Projected Cost		$1,765,456	$1,808,550	$1,968,670	$1,946,992	$2,307,840

j. Training

Highlights of Programs

This program will serve as a critical part of maintaining a high service level throughout the County.

These service levels for this program will be increased through the addition of staff in multiple programs. Additional staff will be assigned to actual training program delivery in fire and EMS areas. This will increase the ability of the section to provide training days, nights and weekends in order to sustain the multitude of needs of a combination career and volunteer system.

Service levels will be increased through the addition of a full-time public education department. This will assure that all citizens, businesses and civic organizations in Loudoun County are educated in the numerous preventative subject areas for fire, EMS and emergency management.

FY 2004

1. Implementation of a full-time public education department. This program will hire a deputy chief of Public Education and six personnel = 6.0 FTEs to deliver programs to schools, businesses and civic organizations within the County. Total projected start-up costs are $100,000 for program design and delivery, $81,709 for salaries and benefits for the deputy chief = 1.07 FTE and $350,000 for six FTEs and 0.5 staff support. Total first-year cost is $531,709. Projected recurring costs are $503,885.

FY 2005

1. Enhance the services of the training division by the addition of six EMS training officers = 6.72 FTEs @ $67,703. This emphasis is on providing initial and ongoing training programs in the area of emergency medical services and rescue. Projected initial costs are $31,827 for office equipment and supplies and $454,954 for six firefighter positions = 6.72 FTEs. Total first-year cost is $486,791. Projected recurring cost is $501,395.

FY 2006

1. Funding for the continuation of enhancing the training function of the department. This year will fund two senior training officers = 2.24 FTEs @ $74,666 each and one training officer = 1.12 FTEs @ $69,734. Total initial cost is $15,914 for start-up and $236,986 for three personnel = 3.36 FTEs. Additional funding is projected to enhance

an adjunct faculty program is estimated at $79,568. Total first-year cost is $332,468. Projected recurring cost is $342,439.

Service Plan Budget Projections for Training

Program Financial Summary	Adopted	Projected	Projected	Projected	Projected	Projected
Expenditures:						
Personnel	887,334	913,954	941,373	969,614	998,702	1,028,663
Operations & Maintenance	844,291	869,620	895,708	922,580	950,257	978,765
Capital Outlay	18,742	19,304	19,883	20,480	21,094	21,727
Total with 3% Inflation	1,750,367	1,802,878	1,856,964	1,912,673	1,970,053	2,029,155
Projected Programs						
FY 04						
Full time Public Education		531,709	481,709	496,160	511,045	526,376
FY 05						
6 EMS Trainers			486,791	501,395	516,437	531,930
FY 06						
3 Trainers and Adjunct Program				332,468	342,439	352,712
Total with Projections		$2,334,587	$2,825,464	$3,242,697	$3,339,974	$3,440,174

k. Communications

Highlights of Programs

Service levels will be increased with the implementation of a new Computer Aided Dispatch (CAD) system. This system will be a replacement program for the existing CAD system. The existing CAD system serves as a call processing program; however, it does not provide information for responding units on target hazards, pre-incident surveys, GIS mapping, etc. The proposed system will work in conjunction with the proposed records management system (RMS) in planning and administration and will allow for the easy transfer of data between emergency functions and reporting functions. The system should be capable of allowing for real-time updates of building files and reports and be capable of interfacing with mobile data computers in selected emergency vehicles. Finally, the system should be capable of managing the various staffing configurations of the volunteer fire and rescue stations in conjunction with the career staffing models.

FY 2005

1. Purchase a replacement state-of-the-art Computer Aided Dispatch (CAD) system. This will complement the 800 MHz radio system that is currently being implemented and assist in dispatching appropriate units efficiently. Projected first-year cost is $2,060,000. Projected recurring cost is $103,000 for software maintenance and updates.

2. Implementation of information and system demand support staff. This position will serve to manage the physical resources of the department, including personnel tracking, and equipment and vehicle management. Total cost for this program will be a $10,300 software cost for inventory and personnel management software. Office equipment and supply cost of $5,150. First-year personnel cost for 1.12 FTEs is $80,000. Total first-year cost is $95,450. Projected recurring cost is $98,314.

Service Plan Projections Summary for Communications

Program Financial Summary	FY 03 Adopted	FY 04 Projected	FY 05 Projected	FY06 Projected	FY 07 Projected	FY 08 Projected
Expenditures:						
Personnel	1,486,551	1,531,148	1,577,082	1,624,394	1,673,126	1,723,320
Operations & Maintenance	250,597	258,115	265,858	273,834	282,049	290,511
Capital Outlay	2,500	2,575	2,652	2,732	2,814	2,898
Total with 3% Increase	1,739,648	1,791,837	1,845,593	1,900,960	1,957,989	2,016,729
FY 05						
CAD System			2,060,000	103,000	106,090	109,273
Physical Resource Manager			95,450	98,313	101,262	104,300
Total with Projections		$1,791,837	$4,001,043	$2,102,273	$2,165,342	$2,230,302

l. Planning and Administration

Highlights of Program

This division is critical in the ongoing management functions and operation of the department through the management of data, physical resources and human resources.

This program area will be enhanced on several different fronts. The greatest increase in service will be through enhancing the data management function and a resulting records management system. This will be a multi-year program that will assist the department in capturing data and using information in the day-to-day operation and future planning of the department. The completion of a wide area computer network will be critical to link all data collection points.

Service levels will be increased through a resource officer that will monitor and manage all of the resources of the department. This will allow for the appropriate assignment of equipment, supplies and personnel.

Additional support will be provided to volunteer agencies by the assignment of a project manager for station construction, renovation and maintenance, as assigned to the Planning and Administration Division.

FY 2004

1. Institution of a Data Management Section to develop a records management system for the entire department and for all stations. Start-up costs to include the following:
    a. General office equipment and supplies.....$15,000
    b. Database Analyst/Statistician.....$51,205
    c. GIS Technician $51,205
    d. Analytical software $50,000
    e. Clerical Support $39,686

Total first year cost is $207,096. Projected recurring cost is $$213,309.

FY 2005

1. Funds for the purchase of a records management system for the entire department. This system will entail incident reporting, station management, budgeting, equipment maintenance, personnel records and training programs. The projected first-year cost for this system is $515,000. Projected recurring cost is $77,250 per year for updates and maintenance.

2. A project manager's position will be established to manage station construction and maintenance projects. A deputy chief handles the current function as an auxiliary job

duty. This position will be assigned primary duties to coordinate the planning, construction, renovation and maintenance of all fire and rescue facilities. The total cost for this program will be $51,500 for vehicle and emergency equipment, $2,060 for protective equipment and uniforms and $5,150 for office equipment and supplies. Salaries and benefits at $72,491for the first year. First-year costs are $131,201. Projected recurring expenses are $90,116.

FY 2006

1. Hiring a 0.5 full time equivalent (FTE) to enter data into computer systems. Multiple computer systems will require data entry and quality control efforts. This position will be assigned to enter data that may not be entered in other areas of the department and to monitor data fields to assure that data is within prescribed error rates. Total program cost to include start-up administrative supplies of $5,305. Part-time salary is $21,218. Total first-year cost is $26,523. Projected recurring cost is $27,319.

2. Funding is to be directed to creating a wide area network between all fire and rescue facilities. This program will be the third phase of a data management section, records management system, and a means to communicate between computers. Costs are estimates and will need to be refined based on the current technology in this fiscal year. Projected first-year cost is $530,450. Projected recurring cost is $109,273.

Service Plan Budget Projections Summary for Planning and Administration

	FY 04	FY 05	FY 06	FY 07	FY 08
Program Financial Summary	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**
Expenditures:*includes Projected Programs					
This is a new cost center and no historical data is available					
Projected Programs					
FY 04					
Data Management Function	207,096	213,309	219,708	226,300	233,089
FY 05					
Facilities Manager		13,201	90,116	92,819	95,604
Records Management System		515,000	77,250	79,568	81,955
FY 06					
Date Entry			26,523	27,319	28,139
Wide Area Network			530,450	109,273	112,551
Total Projected Cost	$207,096	$741,510	$944,047	$535,278	$551,337

c. Comparative Analysis Process

The benchmarking process was completed by the EMSSTAR Group as a part of the study of the system. In completing the benchmarking process (task three), comparison was made against the model developed for the County. In developing this model comparisons were made between the Loudoun County system and other systems that provide similar services. In developing the model for the County, the Loudoun County system was evaluated against paid/volunteer, fire-based, public utility, third service, hospital-based, private, primary service area, tiered response, open competition, subscription and mixed/combination systems. The service plan is predicated on a system that works best in Loudoun County. That system utilizes a combination of volunteers supplemented by career personnel as required to meet the service demands of the County.

VI. 20-Year Service Delivery Requirements

a. Facilities Requirements

Based on the generally accepted standards of station placement, it is projected that the construction of five additional stations and the renovations of the 16 existing stations as listed in the FY 2003 Capital Improvement Plan (CIP) will provide for the needs through 2023. Once these stations are constructed, additional vehicles assigned to respond from existing fire stations may be necessary, but the need for additional fire and EMS stations seems unlikely. The following chart depicts the adopted 2003-2008 CIP program and the changes proposed by this service plan.

Project	Current	Proposed
A. South Riding Fire/Sheriff Station	FY 2003	FY 2003
B. Broadlands Fire/Sheriff Station	FY 2003	FY 2003
C. Dulles/Rt. 28 Fire/Sheriff Station	FY 2004	FY 2004
D. Brambleton Fire/Sheriff Station	FY 2008	FY 2004
E. Lansdowne Fire/Sheriff Station	FY 2009	FY 2005
F. Western Loudoun Fire/Sheriff Station	FY 2006	FY 2009
G. Fire Station Renovations	FY 2007	FY 05-12

b. Operational Requirements

Operational requirements are projected individually through FY 2008 in Section IV. Due to the uncertainty of projecting fire and rescue demands beyond five years, the 20-year projection is based on the items as identified in the service plan through 2008, and from 2008-2022, a standard three percent inflation factor is used to project the financial needs for operational requirements.

Vehicles may be considered capital purchases because of the cost of the vehicle and the life expectancy, but for the purposes of this plan, they are included in the operational requirements section.

The following chart is a 20-year consolidated operational budget projection for the Department of Fire and Rescue Services. The two numbers that are notable is the projections for the each year with no additional programs beyond what is current in 2003—labeled as *Current Projection.* The second number is the projection for the period with the service levels identified in this plan—labeled as *Total with Expanded Service Level.* (Total does not include personnel and operational costs for future stations slated to be constructed on the capital improvement plan.)

Detail Operational Budget Projections-2003-2023

Detailed Operational Budget Projections 2003-2023

	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Departmental Financial Summary	**Adopted**	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**
Expenditures:							
Personnel	15,286,835	15,745,440	16,217,803	16,704,337	17,205,467	17,721,631	18,253,280
Operations & Maintenance	8,678,744	8,939,106	9,207,280	9,483,498	9,768,003	10,061,043	10,362,874
Capital Outlay	241,454	248,698	256,159	263,843	271,759	279,911	288,309
Current Projection	24,207,033	24,933,244	25,681,241	26,451,679	27,245,229	28,062,586	28,904,463
Volunteer Coordination and Support		8,880,172	9,055,880	10,615,880	11,281,607	11,976,784	12,336,088
Field Services		13,912,847	16,566,482	19,652,527	20,551,903	21,888,860	22,545,526
Fire Marshals Office		1,765,456	1,794,120	1,929,843	1,900,238	2,227,246	2,294,063
Training		2,332,878	2,646,964	2,940,573	3,006,140	3,096,325	3,189,214
Communications		1,791,837	3,940,593	2,080,960	2,143,389	2,207,691	2,273,922
Planning/Admin		180,000	787,000	845,250	449,858	463,353	477,254
Total with Expanded Service Level		$28,863,190	#########	$38,065,034	$39,333,135	$41,860,258	$43,116,066
	FY 10	**FY 11**	**FY 12**	**FY 13**	**FY 14**	**FY 15**	**FY 16**
	Projected	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**
Personnel	18,800,879	19,364,905	19,945,852	20,544,228	21,160,555	21,795,371	22,449,233
Operations & Maintenance	10,673,760	10,993,973	11,323,792	11,663,506	12,013,411	12,373,814	12,745,028
Capital Outlay	296,958	305,867	315,043	324,494	334,229	344,256	354,583
Current Projection	29,771,597	30,664,745	31,584,688	32,532,228	33,508,195	34,513,441	35,548,844
Volunteer Coordination and Support	12,706,170	13,087,355	13,479,976	13,884,375	14,300,906	14,729,934	15,171,832
Field Services	23,221,891	23,918,548	24,636,105	25,375,188	26,136,443	26,920,537	27,728,153
Fire Marshals Office	2,362,885	2,433,771	2,506,785	2,581,988	2,659,448	2,739,231	2,821,408
Training	3,284,891	3,383,438	3,484,941	3,589,489	3,697,174	3,808,089	3,922,331
Communications	2,342,139	2,412,403	2,484,775	2,559,319	2,636,098	2,715,181	2,796,637
Planning/Admin	491,571	506,319	521,508	537,153	553,268	569,866	586,962
Total with Expanded Service Level	#########	$45,741,834	#########	$48,527,512	$49,983,337	$51,482,838	$53,027,323
	FY 17	**FY 18**	**FY 19**	**FY 20**	**FY 21**	**FY 22**	**FY 23**
	Projected	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**	**Projected**
Personnel	23,122,710	23,816,391	24,530,883	25,266,809	26,024,813	26,805,558	27,609,724
Operations & Maintenance	13,127,379	13,521,200	13,926,836	14,344,641	14,774,981	15,218,230	15,674,777
Capital Outlay	365,221	376,177	387,463	399,087	411,059	423,391	436,093
Current Projection	36,615,309	37,713,769	38,845,182	40,010,537	41,210,853	42,447,179	43,720,594
Volunteer Coordination and Support	15,626,987	16,095,796	16,578,670	17,076,030	17,588,311	18,115,960	18,659,439
Field Services	28,559,997	29,416,797	30,299,301	31,208,280	32,144,529	33,108,864	34,102,130

Fire Marshals Office	2,906,050	2,993,232	3,083,029	3,175,520	3,270,785	3,368,909	3,469,976
Training	4,040,001	4,161,201	4,286,038	4,414,619	4,547,057	4,683,469	4,823,973
Communications	2,880,536	2,966,952	3,055,960	3,147,639	3,242,068	3,339,330	3,439,510
Planning/Admin	604,571	622,708	641,389	660,631	680,450	700,863	721,889
Total with Expanded Service Level	#########	$56,256,687	#########	$59,682,719	$61,473,200	$63,317,396	$65,216,918

Eisenberg Cardiac Arrest Survival Calculator

	Time (min.)
Call Processing Time (**CPT**, Time from call received to apparatus dispatched)	**1**
Turnout Time (**TOT**, Time from apparatus notification to station departure)	**1**
Patient Access Time (**PAT**, Time from apparatus arrival to the arrival or providers at the patient's side)	**1**
BLS Travel Time (**BLSTT**, Time from BLS apparatus en route to a location to arrival at that location with CPR trained personnel)	**4**
ALS Travel Time (**ALSTT**, Time from ALS apparatus en route to a location to arrival at that location with ACLS trained personnel)	**8**
AED or ACLS (**APT**, Time required to assemble equipment and initiate AED or ACLS care)	**1**
Maximal Survival Rate (**MSR**) represents the maximum percentage survival rate of patients who can survive an out-of-hospital cardiac arrest if CPR, AED, and ACLS were to be provided immediately upon collapse.	**67%**

Predicted Survival Rate (**PSR**) = 67% less (2.3% x minutes to CPR)
less (1.1% x minutes to defibrillation)
less (2.1% x minutes to ACLS)

PSR = MSR - [2.3%*(CPT + TOT + BLSTT+PAT)]-[1.1%*(CPT+TOT+BLSTT+PAT+APT)]-[2.1%*(CPT+TOT+ALSTT+PAT+APT)]

Example: CPR trained personnel on scene in four minutes, automatic defib on scene in four minutes, and ALS on scene in eight minutes
PSR= 67% - [2.3% x (1.0 +1.0+4.0+1.0)] - [1.1% x (1.0+1.0+4.0+1.0+1.0)] - [2.1% x (1.0+1.0+8.0+1.0+1.0)]

PSR = 16.9%

[1]Based on information found in Eisenberg, M.S., et.al., (1993), "Predicting Survival From Out-of-Hospital Cardiac Arrest: A Graphic Model," Annals of Emergency Medicine; November 1993.